DECEMBER 24, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Appliances:

Materials Scarce, Customers Too
They'll Dull the Glitter in '52

—page 28

TOY MAKING
—Metalworking in Miniature, p. 54

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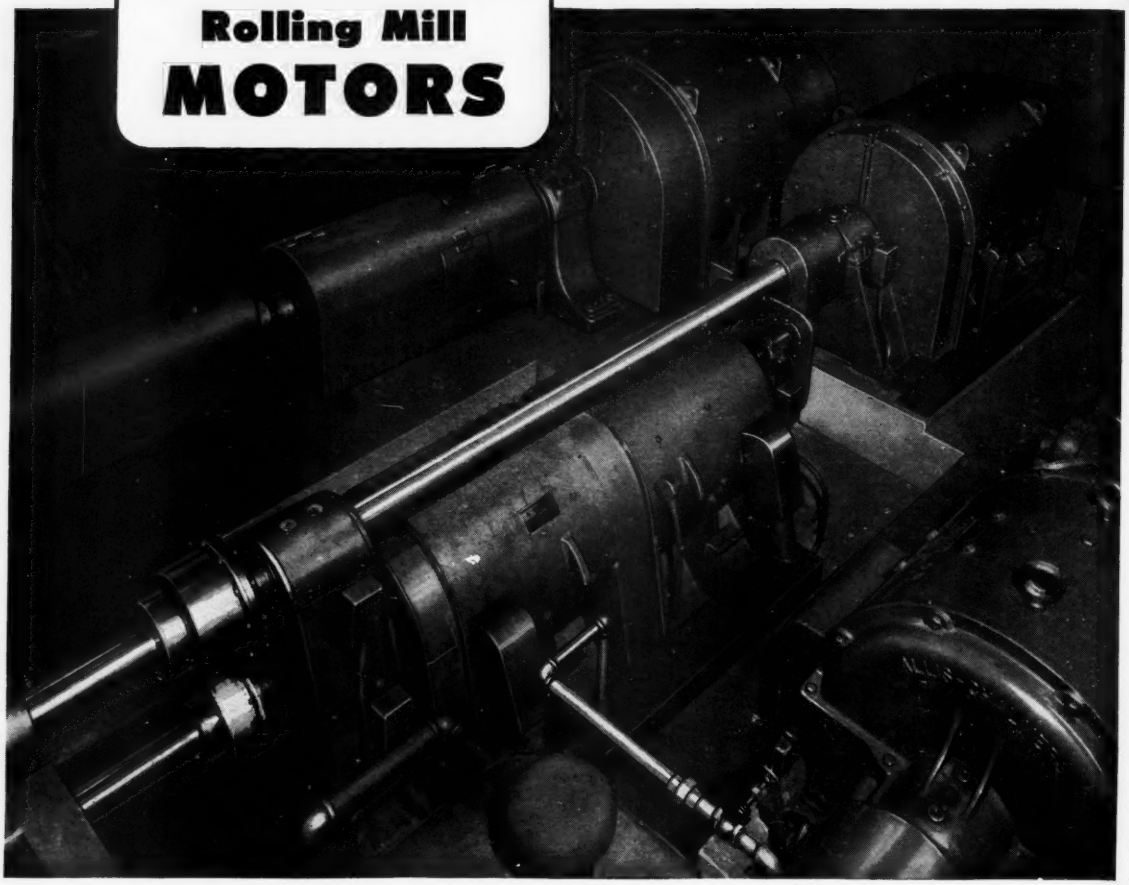
ALLIS-CHALMERS
Rolling Mill
MOTORS



ENGINEERED TO FIT
when there's No Space to Spare

PERHAPS your space limitations aren't as restrictive as those imposed by the twin drive shown above. After all, connecting separate motors to parallel shafts only a foot or so apart does demand just about the utmost in compactness. That's why this installation is a good indication of what Allis-Chalmers engineering can do for you.

Moreover, this Granite City Steel Company temper pass mill involved additional engineering because it is a revamp—from a single-stand to a two-stand mill. Naturally it was desired to retain as much of the original equipment as possible. That meant designing the new motors and control to fit in with units that were supplied by Allis-Chalmers some ten years ago.

Both the delivery and the entry tension rolls are powered by new twin-drive dc motors. The delivery tension drive is shown above. It uses a 300-hp top roll motor and a 150-hp double-armature bottom roll motor — both with speed ratings of 250/650 rpm.

These motors were designed to fit the Granite City Steel Company's requirements. You can get motors to fit *your* requirements simply by calling in your nearby A-C representative. Backed by engineering specialists, he will help you make your selection from a complete line of dc and polyphase motors—from general purpose sizes to the largest used in industry. Allis-Chalmers, Milwaukee 1, Wisconsin. A-3516

ALLIS-CHALMERS

MAYARI R adds strength to electric freight locomotives

In building six new type A-C freight-locomotive units, General Electric used Mayari R for some of the structural members in the platforms. For instance, the transverse members or bolsters located between the main underframe channels, and the draft-gear housing between the main channels at the end of each platform, are made from this low-alloy, high-strength steel. Mayari R was used because it provided the higher strength needed without increasing the deadweight beyond the specified limits. In other words, it added strength without adding excess weight.

Mayari R has been used to advantage in railway equipment for more than 15 years: in hopper cars, gondolas, box cars, passenger and baggage cars as well as locomotives on the country's leading roads.

Mayari R has a yield point of 50,000 psi minimum, almost twice that of plain carbon steel. Higher working stresses can be used. In addition, it has 5 to 6 times the atmospheric corrosion resistance of carbon steel. Longer service can be expected.

Full information on the applications of Mayari R is readily available. Write for Catalog 259.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

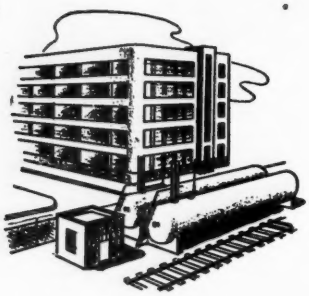
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*

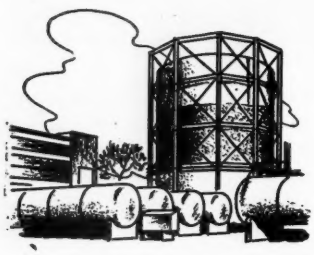
Philgas*

. . . A Superior LP-Gas Proven in Service



FOR INDUSTRIES

Leading industries use Phillips *66* Philgas successfully for heat treating, mold drying, core baking, ceramic firing and many, many other operations. Automatic Philgas systems assure constant furnace temperatures and atmospheres; constant pressures, high or low.



FOR UTILITIES

Many progressive utilities use Phillips *66* Philgas to augment natural or manufactured gas. High-quality Philgas is uniform in thermal value and gravity, and is free from harmful contaminants. Automatic operation cuts down on overhead.

*Philgas is the Phillips Petroleum Company brand name for its high quality propane-butane LP-Gas or bottled gas.

Phillips 66

PHILLIPS PETROLEUM COMPANY

Sales Department **Bartlesville, Oklahoma**

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kan.)

Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

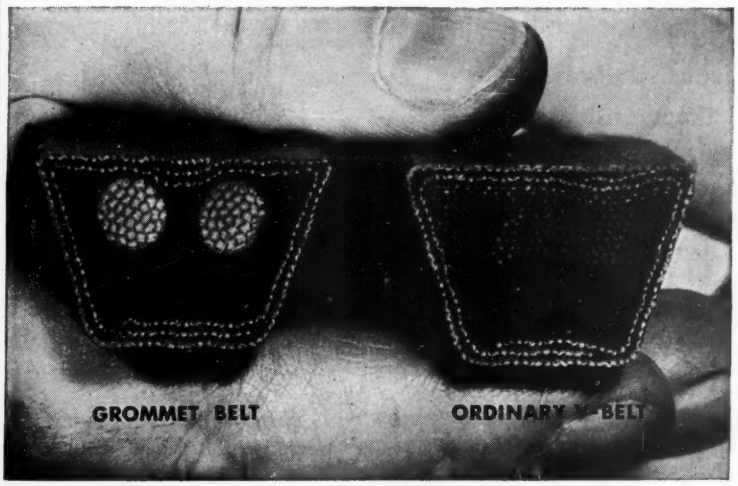
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. SE-12
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

Name_____

Firm Name_____

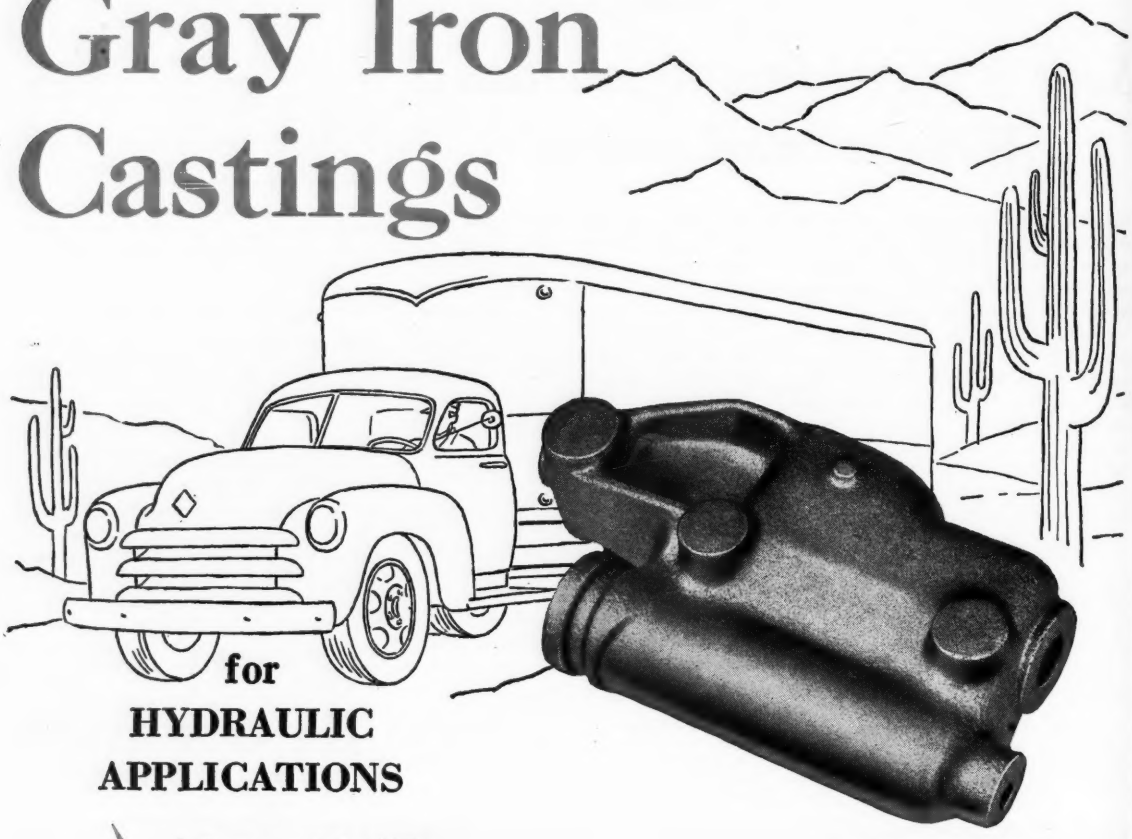
_____

Street Address_____

City_____

State_____

Eaton Permanent Mold Gray Iron Castings



for HYDRAULIC APPLICATIONS

- **Free machinability**
- **Dense, homogeneous structure**
- **Freedom from leakage under pressure**
- **Machines to high, mirror-like finish**
- **Properly annealed; no growth or distortion after machining**

Send for your copy of the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings."

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CLEVELAND, OHIO

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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 26 DECEMBER 24, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 116. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

***Next Week*... Pure Vanadium—A promising engineering material ... Eliminate Grinding Damage, Reduce Tool Failure ... Test Equipment Redesign Pays Off**

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"PLA-TANK IS SENSATIONAL"—

"ANSWERS MY CORROSION PROBLEMS"

"HELPS SALVAGE VITAL EQUIPMENT"—

" 'HOT POTATO' OF THE YEAR"—

These are typical comments of production executives and chemical engineers who visited our display during the Chemical Industries Exposition in New York.

They saw and examined

PLA-TANK(T)

a new, proved, resin-bonded Fiberglas ®, corrosion-resistant material for

***Tanks**
***Linings**
***Drain Pipe**
***Fume Duct**
***Vent Hoods**
***Plating Baskets**

Readily Available . . .

Quick Deliveries

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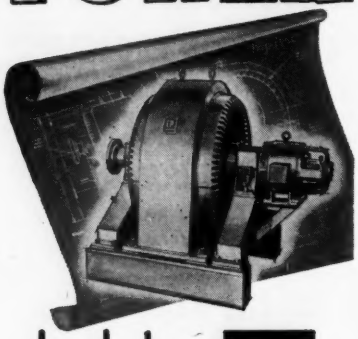
for
custom-engineered
POWER



look to.. EP

Since 1909, the job of The Electric Products Company has been to create and develop special electrical rotating equipment . . . motors and generators to do existing jobs better or to reach into new fields to do jobs that couldn't be done before. The natural "by-product" of our more than 40 years of specialization is that you get equipment designed and built to the exact requirements of your application . . . equipment that has greater dependability, longer life and that requires less maintenance.

Send in the coupon below for detailed information about our Custom-Engineered synchronous motors and generators . . . d-c motors and generators . . . induction motors . . . battery chargers . . . frequency changers.

A nation-wide sales engineering and service organization stands ready to meet all User requirements.

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PRODUCTS COMPANY

1720 CLARKSTONE ROAD
CLEVELAND 12, OHIO

Attach coupon to your letterhead for your copy of Bulletin 2-200.

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE____ STATE_____
X-74

Behind the Scenes..

Identified

Editor Earl Shaner agreed to make a talk before a group of builders in Syracuse, N. Y. The Syracuse gentleman who was handling the arrangements said he would meet Mr. Shaner at the depot but both men forgot to describe themselves to the other. Not until Mr. Shaner was descending from the train did it occur to him that they might have difficulty getting together.

The Syracuse man met the situation admirably. He stood at the train gate with a copy of STEEL prominently displayed before him and a tearsheet of our masthead stuck in his hatband.

An Epistle from London

We've just received a letter from the North Atlantic Defense Production Board in London. Brig. Gen. Dan F. Callahan writes to thank us for a copy of *Modern Ordnance Production,* a book published by Penton Publishing Co. and based largely on various ordnance articles that have appeared in STEEL.

The volume is available from Readers' Service Department, STEEL, Penton Bldg., Cleveland 13. The cost: Only $2.50.

On Synonyms

Mary Kay Smith of Armco Steel Corp. writes in to help us in our search for a synonym for "yearbook". She suggests "annual" as the term to apply to our big first issue of the year which comes out Jan. 7, 1952. Some years ago we did use that term, but abandoned it as being too general a word. G. C. Pinckney of Central Foundry Co. suggests "referandum." That may be an excellent word but we can't find it in any of the dictionaries we have. As a coined term it's too close to "referendum."

Mary Kay Smith, incidentally, has a word problem. She describes herself as a "female draftsman." Now, something must be done about that. Draftswoman? Drafter? Drafting specialist? All the women coming into industry these days will get a complex of some sort if we don't invent feminine titles.

Coming Up

The Yearbook issue, by the way, is being worked into shape by the editors. We had an advance look at some of the copy the other day and were particularly impressed by the charts and tables in the Facts & Figures Section. More than 400 tables and charts pertaining to the metalworking industry are assembled there for your use throughout the coming year.

Some parts of the special issue went to press as long ago as last Monday. The various sections of the magazine will be gathered, stitched and bound by a new collating machine, a complex device that mechanically assembles the publication.

Puzzle Corner

In the problem of Dec. 10, the man's head travels 37.699 feet further than his pedal extremities. First in with the answer were Lewis D. Rice of Timken Roller Bearing Co., L. B. Shapleigh of Bethlehem Steel Co., Paul J. Foehl of Midwest Steel & Iron Works Co., H. C. Osborne of Racine, Wis., Paul T. Griffiths of Pittsburgh Tool Steel Wire Co. and J. C. Tennison of Tennison Brothers Inc.

A will reads, "I leave my books to Jones, Smith and Brown, who are to choose in a certain order. No person who has seen me in a green tie is to choose before Jones. If Smith was not in Oxford in March, 1920, the first chooser never lent me an umbrella. If Smith or Brown has second choice, Brown comes before the one who first fell in love."

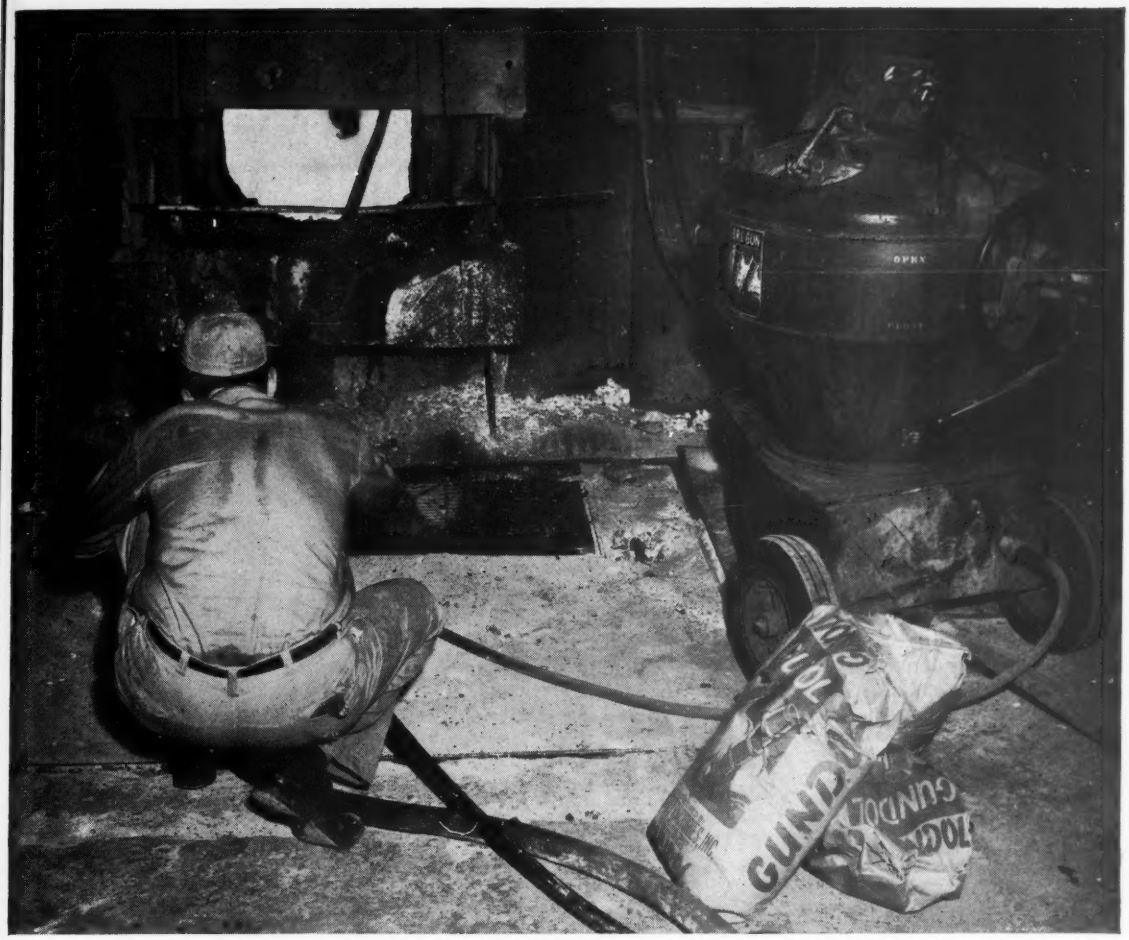
Unfortunately none of the legatees could remember any of the relevant facts, but the deceased's solicitor pointed out that assuming the problem to be properly constructed, that is, assuming it contains no statement superfluous to its solution, the relevant data and order could be inferred. What was the inferred order of choosing and who lent the deceased an umbrella?

Christmas Spirit

The artists got into the spirit of Christmas on this week's cover, you'll notice—the bow motif. While we're on the subject of Christmas, we hope all your Yuletide wants are as easily satisfied as those of our three-and-a-half-year-old daughter. She wants "a shiny bike and packages."

Shrdlu

(Metalworking Outlook—Page 17)



Here's a specialty steel maker who doubled sidewall life with a BRI Gun

THE Ingersoll Steel Division of Borg-Warner, operating two 7-ton electric furnaces, recently bought a BRI Gun. It is used between heats for quick repair of furnace sidewalls with Gundol.

Lining life, according to the Melting Superintendent, used to average about 85 heats. Now it averages better than double that figure. For instance, since the last relining job, one of the furnaces has finished a run of 194 heats. The saving in refractory costs is significant, and even more important, the elimination of shutdowns for frequent relining adds materially to steel production.

With two more furnaces soon to be installed, the company plans to standardize sidewall maintenance, using Gundol with the BRI Gun.

This is one more example of the practical value of our gun refractories. Long since found essential for large furnace maintenance, Gundol and Gunmix are now proving just as economical for use in smaller furnaces.

So if you operate electric furnaces, large or small, we believe you will be interested in the economies to be realized through the use of a BRI Gun and gun refractories in your shop.

Basic Refractories Incorporated 845 HANNA BUILDING, CLEVELAND 15, OHIO

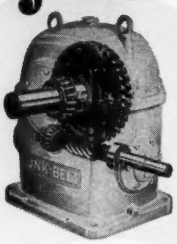
Exclusive Agents in Canada: REFRACTORIES ENGINEERING AND SUPPLIES, LTD., Hamilton and Montreal

Get the one speed reducer that best fits your job

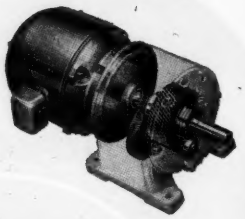
LINK-BELT builds all three types of enclosed gear drives

NO ONE speed reducer solves *every* reduction problem. That's why Link-Belt builds all three — Worm, Helical and Herringbone Gear Drives. Your Link-Belt power transmission engineer will recommend the *right* reducer for your needs.

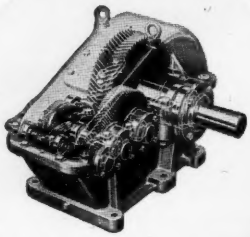
You can be sure you get the one that suits all your requirements for ratio, space, shaft position, shock loading and many other factors. Precision-engineered for quiet, economical power transmission, all Link-Belt drives will give you long service under the toughest operating conditions.



On Worm Gear Drives, write for Book 2324-A



On Gearmotor and Helical Gear Drives, write for Book 2247

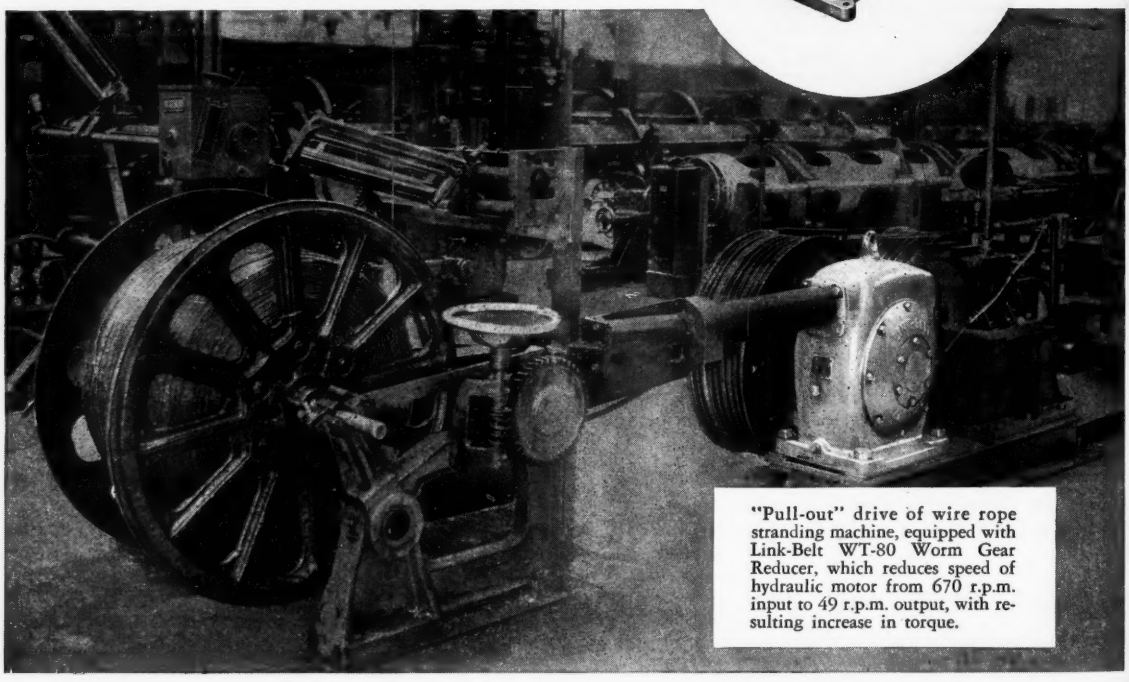


On Herringbone Gear Drives, write for Book 2419

LINK-BELT

ENCLOSED GEAR DRIVES

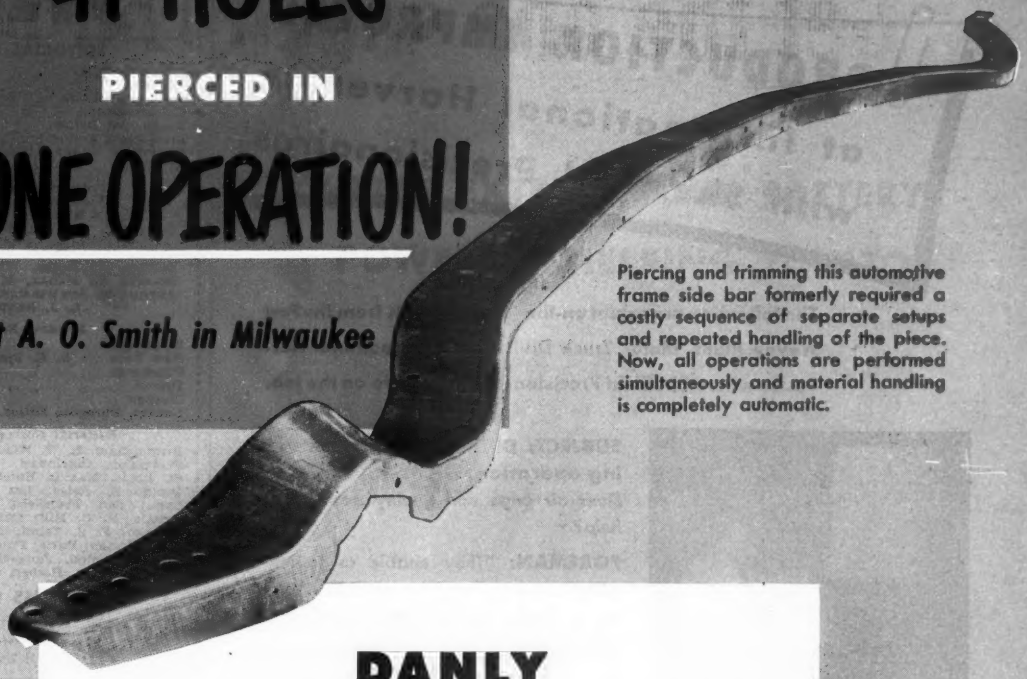
LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,416-A



"Pull-out" drive of wire rope stranding machine, equipped with Link-Belt WT-80 Worm Gear Reducer, which reduces speed of hydraulic motor from 670 r.p.m. input to 49 r.p.m. output, with resulting increase in torque.

41 HOLES
PIERCED IN
ONE OPERATION!

at A. O. Smith in Milwaukee



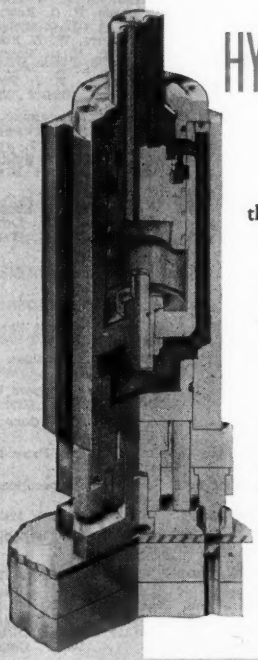
Piercing and trimming this automotive frame side bar formerly required a costly sequence of separate setups and repeated handling of the piece. Now, all operations are performed simultaneously and material handling is completely automatic.

DANLY

HYDRAULIC METALWORKING EQUIPMENT

with automatic stripping action

Cost saving solutions to metalworking problems like this typify the results you can expect with Danly Hydraulic Metalworking Equipment . . . designed and built to your specifications. Compact power cylinders like the one shown here, with capacities ranging up to 200 tons, are applied singly or in any necessary combination to help you save man hours, increase output and reduce costs. Write today for complete information . . . Danly engineers are at your service for detailed discussion of your application.



Cutaway view of a Danly Hydraulic Power Cylinder. At A. O. Smith, 16 of these units are arranged to operate simultaneously performing the multiple piercing and trimming operations described above . . . each unit complete with automatic hydraulic stripping action. Extra long precision guides permit several punches to be mounted in each unit.

PIERCING EXTRUDING TRIMMING RIVETING

DANLY

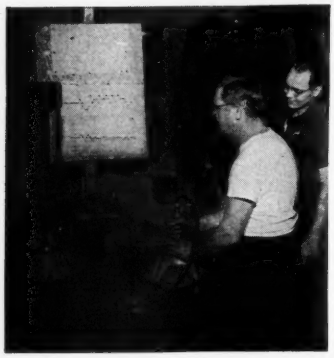
DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue

Chicago 50, Illinois

PRODUCTION IMPROVED at International Harvester with Sheffield Precisionaires

The following are actual on-the-job comments from the Fort Wayne Plant, Motor Truck Division of International Harvester where Sheffield Precisionaire gages are on the job.



SUBJECT: Differential carrier reaming operation.
Does air gage and quality control chart help?

FOREMAN: "They enable us to know where we are. Quality is improved, resulting in better pinion cage assembly fit."

OPERATOR: "It's the best thing we ever had. We can see gradual size change and be on guard to know when to change reamers. I have no worry about scrap or rework."

SUBJECT: Ring gear boring operation.
Has air gage and quality control chart been helpful?

FOREMAN: "Scrap was reduced from 3% to practically nothing. Improved method of setting boring tool and redesigned facing tool were developed. Air gage check is much faster than old method."

OPERATOR: "We know where we are all the time."

For more information about Precisionaires, other Sheffield products and services write to "Customer Consultation."

5834

the *Sheffield* corporation
Dayton 1, Ohio, U. S. A.

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Plus-Performance Plan

. . . HELPS EXTEND YOUR BATTERY POWER BY HELPING YOU TO

KNOW THE CONDITION OF YOUR BATTERIES!

Knowledge of the condition of your batteries is important because: (1) you know when batteries should be replaced to assure you of uninterrupted power, (2) you know whether your batteries are being overworked and (3) you can be sure of correct charging and systematic maintenance. For these reasons, the GOULD PLUS-PERFORMANCE PLAN emphasizes the various ways to determine battery condition.

The GOULD PLUS-PERFORMANCE PLAN consists of manuals, articles, specifications, bulletins, record cards, charts and graphs covering every phase of battery care. It gives you information on how to select charge, handle, maintain, inspect and test that can improve your battery performance as much as 50%! It's FREE. Write for booklet describing the plan.

Temperature and specific gravity readings indicate battery condition.

DETERMINING INDUSTRIAL TRUCK BATTERY CONDITION

RECORDS—Specific gravity, time and temperature readings of pilot cells before and after charging should be taken daily and compared with previous readings.

TEST DISCHARGE—To determine whether a battery is delivering rated capacity, make a test discharge. Discharge a fully charged battery at 6-hour rate until the voltage drops to 1.75 volts per cell. Compare ampere hour capacity obtained with rated capacity. Batteries delivering less than 80% of rated capacity, with all cells uniform, should be considered for replacement.

Gould "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

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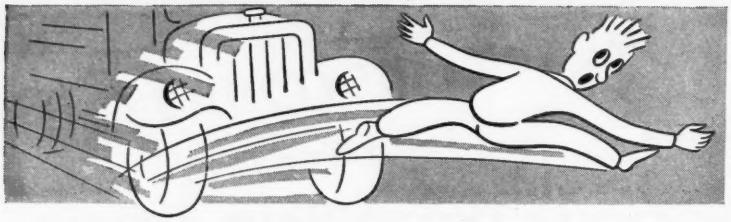
GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries



For the spring of your life see the man with a

Versatile Torrington Spring Coiler

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.

MODEL W-11 SPRING COILER
The 14 different Torrington Spring Coilers cover a range of wire diameters from .003" to .750".

SPECIFICATIONS
of the Model W-11 Spring Coiler

Wire diameter range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra Wire Feed Gears Available)

Coil Range (O.D.): 3/32" to 1-9/16"

Production: 23 to 190 springs per minute with variable speed drive.

Torsion and other attachments are available.

The TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

LETTERS
TO THE EDITORS

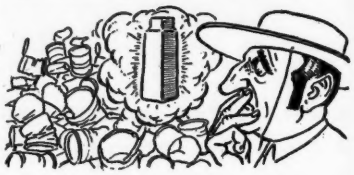
New 'Who's Who' Coming

We would like to receive three copies of "Who's Who in the Defense Organization" (Oct. 1, p. 45) for use by our executives covering negotiations in Washington.

W. F. Ferris, secretary
Bennett Office Inc.
Minneapolis

• *In answer to Mr. Ferris, and the many other* STEEL *readers who have recently requested this listing, we are sorry but we are all out of these reprints. A new "Who's Who" will appear in our Metalworking Yearbook issue, Jan. 7.*

Steelmaking With Tin Cans



For a friend in Sao Paulo, Brazil, I would like to know how to get rid of impurities, especially tin, when tin cans are used in making steel in an electric furnace. Also, I would like information regarding the making of iron, without using coke, but using a high grade ore.

Frank A. Doll
Detroit

• *Steelmakers use tin cans discriminately and in restricted amounts to prevent tin content of the open hearth heats exceeding about 0.10 per cent, which is considered the maximum to avoid difficulties in the rolling operation. If your Brazilian friend intends to use tin scrap entirely, it might pay him to investigate some detinning process. Write United States Department of Interior, Bureau of Mines, Washington 25, D. C., to obtian Bulletin No. 270 and Report of Investigation No. 4402, published February, 1949, for details on the production of sponge iron.*

For Easy Reference

Will you please send me tear sheets of the article "Metallography of Alloys of Titanium with Oxygen, Carbon and Nitrogen" (Nov. 19, p. 88).

W. H. Hawley Jr.
Department of the Navy
Bureau of Ships
Washington

• *Tearsheets have been sent.*

We would like additional information on the process described in "Nitric Acid from Thin Air", (Dec. 10, p. 87). We are establishing a plant for just this kind of process.

Charles F. Zipper
Zipper Marohl Co.
St. Paul

• *Write Professor Farrington Daniels, University of Wisconsin, Madison 6, Wis.*

FOR A SMOOTH, FAST TURNAROUND

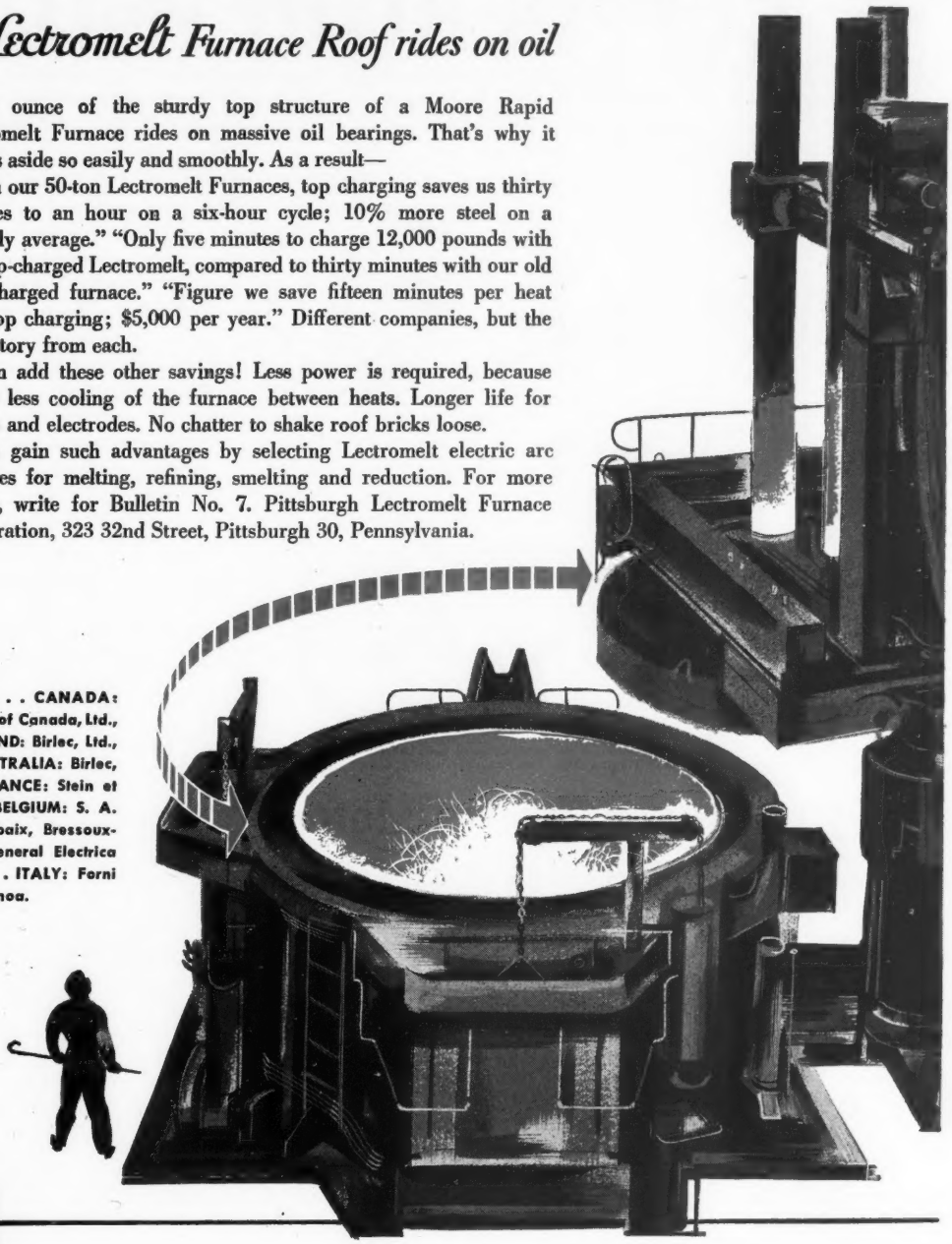
a Lectromelt Furnace Roof rides on oil

Every ounce of the sturdy top structure of a Moore Rapid Lectromelt Furnace rides on massive oil bearings. That's why it swings aside so easily and smoothly. As a result—

"On our 50-ton Lectromelt Furnaces, top charging saves us thirty minutes to an hour on a six-hour cycle; 10% more steel on a monthly average." "Only five minutes to charge 12,000 pounds with our top-charged Lectromelt, compared to thirty minutes with our old door-charged furnace." "Figure we save fifteen minutes per heat with top charging; $5,000 per year." Different companies, but the same story from each.

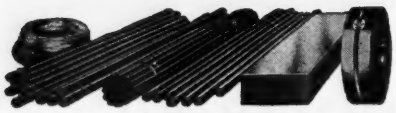
Then add these other savings! Less power is required, because there's less cooling of the furnace between heats. Longer life for linings and electrodes. No chatter to shake roof bricks loose.

You gain such advantages by selecting Lectromelt electric arc furnaces for melting, refining, smelting and reduction. For more details, write for Bulletin No. 7. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.



Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

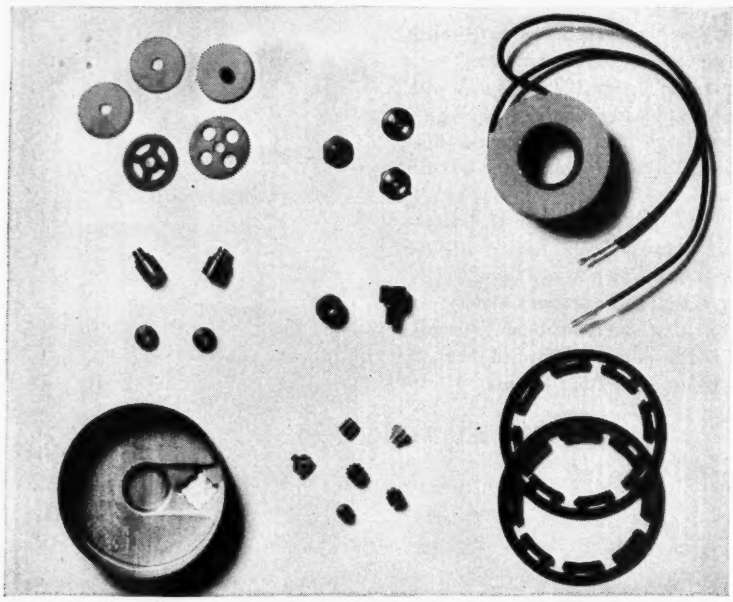
WHEN YOU MELT... MOORE RAPID *Lectromelt*



BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

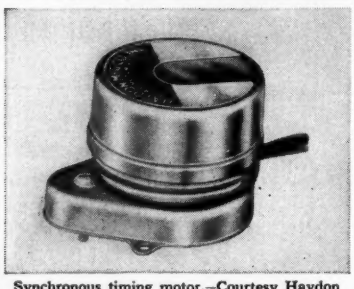


Gears, bushings, coil, motor cover, pinions and copper shading rings used in 400-cycle synchronous timing motor.—Courtesy Haydon Mfg. Co., Inc., Torrington, Conn.

Synchronous Timing Motor Designed for 400-Cycle Current

The use of 400-cycle current by the military and industry for many types of servo mechanisms and in communications systems brought about the design and manufacture of the illustrated synchronous timing motor.

The motor is used in time delay relays, elapsed time indicators, potentiometer controls, and sequence, interval and repeat cycle timers. Many other special timers have been or are being developed to utilize this motor.



Synchronous timing motor.—Courtesy Haydon Mfg. Co., Inc., Torrington, Conn.

Only frequency control is necessary to insure accurate timing since the motor is not affected by variations in temperature, altitude, supply voltage and load within the operational limits of the motor itself.

Self-Starting Insured

The motor is essentially two phase with two coils, cores and interlacing field pieces. To insure self-starting, a capacitor is put in series with one coil, thus giving this coil a leading flux effect.

Copper Alloys Widely Used

As in all electric motors, copper and copper-base alloys are widely used not only for their electrical characteristics but for corrosion resistance and ease of working or machining.

The motor cover is cartridge brass (70% copper and 30% zinc) which can be readily worked, has good corrosion resistance and a tensile strength of 76,000 psi in the hard-drawn condition. The cover is cupped, drawn and trimmed, then stamped with the company name and other information.

Since shading rings must have high electrical conductivity, electrolytic tough pitch copper 99.9% pure is used because of its 98-100% conductivity.

Self-Lubricating Bearings

Rotor bearings are of graphite bronze, which was selected for its self-lubricating properties. However, for the output bearing where long life and strength is demanded under comparatively heavy loads, commercial bronze is the choice. This alloy contains 89.5% copper, 8.5% zinc and 2% lead, which increases the machinability considerably. Many standard gear combinations are available to give varying output speeds depending on the timing involved.

Wheels of Clock Brass

The wheels (gears) are made from clock brass (66% copper, 2% lead, and remainder zinc). The lead helps to eliminate burrs in machining the gear teeth and in blanking and piercing the wheels. Since the lead exists in the metal as small globules, some lubrication is obtained as the lead is burnished over the surface of the teeth while in operation.

Two alloys are used for the pinion gears depending on the load put on them.

Free cutting brass rod (61% copper, 3.4% lead and remainder zinc) permits clean drilling and machining of the pinions and gives long life under relatively light loads. When the loads are greater, a leaded phosphor bronze is utilized.

Back Issues of Copper Alloy Bulletin Available

Back issues of the Copper Alloy Bulletin are available and may be obtained by writing to Bridgeport Copper Alloy Bulletin editor. If you wish to have your name put on our mailing list for the monthly Bulletin write to us on Company stationery.

(7495)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

Arsenic Inhibits Dezincification In Sea Water

While cupric chloride solution has been very useful for studying the mechanism of dezincification and its prevention, it does have certain limitations. For example, test results obtained from such solutions do not apply directly to service conditions. Recognizing that such laboratory tests do not simulate service conditions closely enough to give an indication of what may be expected when inhibited brasses are exposed to water coming from wells, lakes, rivers and the ocean, tests have been conducted in these environments.

One set of these tests[2] was carried out in flowing clean sea water. The analyses of the alloys tested are given in Table I. The results of these corrosion tests after exposure for one year in clean flowing sea water are tabulated in Table II. The ratio of the depth of corrosion calculated from loss in tensile strength to the depth of corrosion calculated from loss in weight is used to reveal the presence of cracking, intergranular corrosion, pitting, dezincification or incomplete removal of corrosion products. The uniform corrosion is indicated by values for this ratio which approach unity (1.0).

The results indicate that the addition of .04% of arsenic to Admiralty metal aids in inhibiting dezincification in sea water and that it has also lowered to a small degree the over-all corrosion rate. The low ratio for arsenical Admiralty metal clearly indicates that no intergranular corrosion or dezincification has occurred during the first year in sea water, although the surface was slightly roughened.

The addition of .10% of arsenic to Muntz metal very markedly inhibited dezincification in sea water. This concentration of arsenic had an effect almost equal to that of .5% of tin. Examination of the broken tension specimens revealed that the high ratio (3.88) for non-inhibited Muntz metal was due to deep uniform dezincification.

[2]C. L. Bulow, Trans. Electrochemical Soc. 87, 319-352 (1945).

TABLE I
CHEMICAL COMPOSITION OF ALLOYS TESTED IN SEA WATER

	Copper	Zinc*	Tin	Lead	Iron	Arsenic
Plain Admiralty Metal	71.60%	27.34%	1.05%	0.005%	0.005%	0.00%
Arsenical Admiralty Metal	71.21	27.62	1.12	0.004	0.004	0.041
Plain Muntz Metal	59.75	40.23	0.00	0.01	0.007	0.00
Arsenical Muntz Metal	63.12	36.77	0.00	0.003	0.01	0.095
Naval Brass	61.66	37.59	0.73	0.004	0.02	0.00

*By difference.

TABLE II
EFFECT OF ARSENIC AS AN INHIBITOR OF DEZINCIFICATION WHEN ALLOYS ARE TESTED IN FLOWING SEA WATER FOR 1 YEAR
(Average of 4 tests)

Alloy	Depth of Penetration Based on Loss in Tensile Strength in Inches per year, ipy	Depth of Penetration Based on Loss in Weight in Inches per year, ipy	Ratio of Loss in Tensile Strength/Loss in Weight	Remarks
Plain Admiralty Metal	0.00283	0.00178	1.59	Uniform with trace of dezincification.
Arsenical Admiralty Metal	0.00237	0.00160	1.49	No dezincification detected.
Plain Muntz Metal	0.00888	0.00229	3.88	Badly dezincified.
Arsenical Muntz Metal	0.00309	0.00210	1.47	No dezincification detected.
Naval Brass	0.00261	0.00183	1.43	No dezincification detected.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Adjustable Drill Jig is said to reduce drilling time on small lots and eliminate the need for special jigs for larger quantities. Typical operations include drilling holes for cotter pins, drive bins for bayonet joints and wiring holes for cap screws. The jig can be used for drilling holes from ¼ to 2 in. through round and hex stock, and from ¼ to 1¼ in. for cap screws. Overall dimensions of the unit are 5¼ in. high, 4¼ in. wide and 7 in. long. **No. 1195**

Bench Type Parts Cleaner brushes and flushes away oil, grease and dirt. Solvent is pumped through tube to hollow handle brush. Parts are cleaned on screen platform which captures flushed off dirt. The unit operates on 115 volts, AC or DC. **No. 1196**

Vertical Milling Head performs angle boring and milling operations on horizontal milling machines. Tool has micrometer vertical quill spindle feed calibrated in 0.001 in. Vertical spindle travel is 1¾ to 3 in. Gear rating is 1½ to 15 hp. Twenty-five models are available for every make and size horizontal milling machine. **No. 1197**

Pneumatic Thread Gage handles thread sizes from 0.059 to 2.510 in. The unit consists of an air motor with friction clutch and gage adapter. Weighing only 34 oz., the gage can be suspended over work area by work balancer, or can be vertically or horizontally bench mounted. Foot valve allows the use of both hands. **No. 1198**

Pipe Wrench features toothed head which acts as a cam follower when the head is inserted in a pipe or tube and turned. The parts pull outward and grip the inner wall of the pipe, holding it firmly for turning. Reversing the action releases the pressure and grips again for drive in the opposite direction. **No. 1199**

Rotary Table provides indexing action in connection with station stops for 4, 6, 8, 12 or 24 positions in 360 degrees. The air-operated unit uses 50 to 150-lb. pressure. It can be applied to punch presses, drilling machines, broaching machines and for various production operations. Mounted on a radial and a thrust ball bearing, it can be set up either horizontally or vertically. **No. 1200**

Measuring Tools and Instruments have been assembled to provide the required inspection operations to meet Military Specifications MIL-Q-5923 (UDSF) for inspection measuring and testing equipment, and for production tooling under the respective designations 2.5.1 and 2.5.2. The equipment includes a Wilder micro projector, a binocular-type three dimensional microscope, a toolmaker's microscope, an Opti-Comparitol, a set of illuminated magnifiers and a complete collection of gages and micrometers. **No. 1201**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
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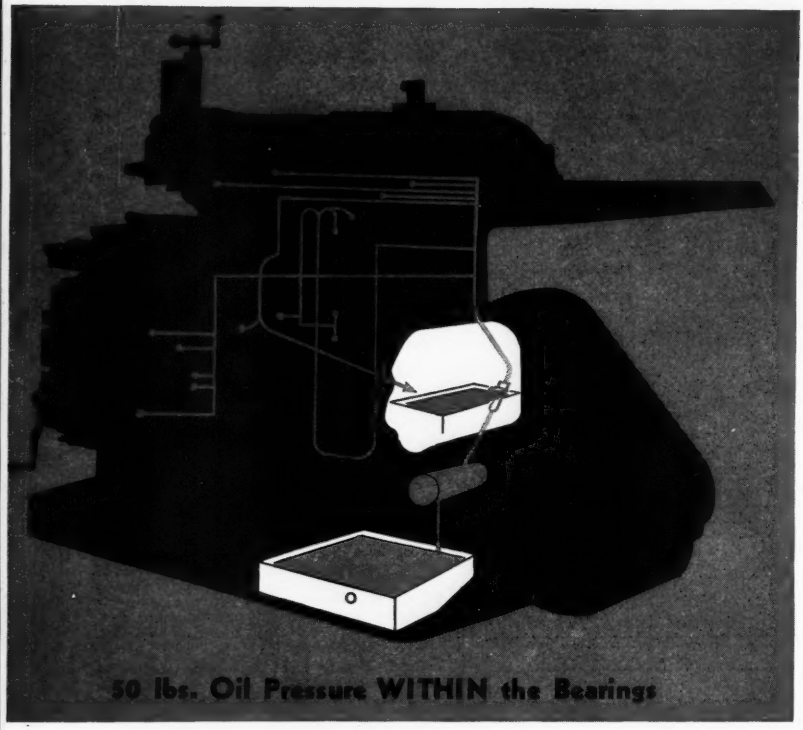
—another Cincinnati Exclusive Feature!

50 lbs. Oil Pressure

maintained in running bearing surfaces



For the first time in the shaper field, bearings on a shaper operate under a positive 50 lbs. oil pressure within the bearings.

Even the most inaccessible bearings of the Cincinnati rocker arm and crank block assemblies operate under a positive pressure oil supply. For the first time, inefficient lubrication by dripping or spraying oil on these bearing surfaces is replaced by full pressure lubrication.

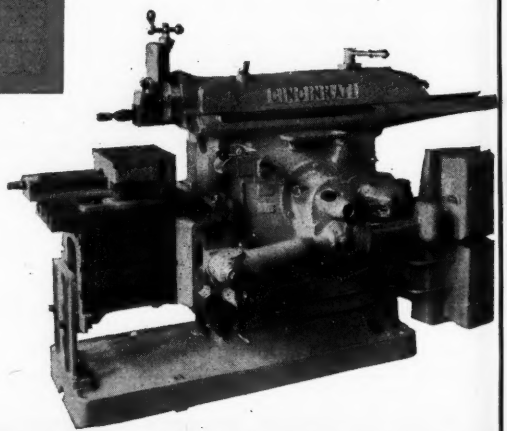
Wear and friction are reduced to a minimum giving Cincinnati Shapers extra years of maintained accuracy and maximum power at the cutting tool.

The system is fully automatic, saves the operator time and is insurance against oiling failures.

Write for Catalog N-5, fully describing these versatile, powerful and productive Cincinnati Shapers.

Other exclusive features . . .

1. Cincinnati Electro-Magnetic Clutch
2. Cincinnati Multiple-Cam Feeds
3. Cincinnati Single Adjustment Tapered Gibs.
4. Cincinnati Extended Solid Ram Bearings
5. Cincinnati Dovetail Crank Block and One-piece Crank Gear.
6. Cincinnati Protected Table Support.



THE CINCINNATI SHAPER CO.

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CINCINNATI

The Metalworking Outlook

December 24, 1951

Defense Spending Fluctuates

Military spending is fluctuating. Until midyear it was increasing steadily and hit an annual rate of about $40 billion in August, then dropped to an annual rate of $33 billion in September, hit $41 billion in October and fell a little from that in November. At this pace we may have trouble reaching the military spending goal of $49 billion in fiscal 1952. The goal for fiscal 1953 is $65 billion, $62 billion for fiscal 1954.

Now, the Expediter

New expediter for defense spending is Clay Bedford, an Oakland, Calif., industrial engineer. His job will be to balance any lopsided procurement and investigate charges like the one by the House Small Business Committee that International Harvester will have to tool up extensively to produce on its multimillion dollar contract for M-1 rifles while smaller firms could handle at least part of the contract with little or no tooling required. Mr. Bedford will serve as special assistant to Defense Secretary Robert Lovett.

Small Business' Share in Pie

Small firms obtained 18.5 per cent of the dollar value of prime military contracts in the third quarter. That compares with 21 per cent for fiscal 1951 and 24.5 per cent for fiscal 1950. Although the quarterly figure is low, there's some ground for optimism. During that quarter, 16 per cent went to small business in July, 18.7 per cent in August and 22.1 per cent in September. Judging from partial figures in for October from the Navy, the percentage will be a little higher that month.

Trouble in Cold-Finished Bars

Expect no immediate letup in demand for cold-finished steel bars. They're used in large shells, and output of that product is increasing. Cold-finished bars are needed for many other military items, plus fasteners, steel shafts, machine tool parts and hundreds of additional critical uses. Hot-topped steel is needed for the bars, and there's simply not enough to go around. Demand is expected to increase still more by the second quarter, largely because of greater emphasis on shell production.

Gripes Mount on Military Specs

Complaints are getting louder about "unreasonable military specifications" for some defense products. Cited is the case of an automotive part that cost one-third of a cent to make but 3 cents to package according to Army specifications. Another example is the requirement of an eight-pound brass identification plate for a 110-pound wood-

Production-Engineering News—p. 53 *The Market Outlook—p. 87*

working machine. The copper in that plate was sufficient to wire the machine, and the device's essential data could have been engraved on an identification plate containing one-tenth the required brass, according to the manufacturer.

Embarrassing Inventories

Many suppliers catering to automotive and appliance manufacturers whose production is down are embarrassed by steel inventories, especially of sheet and chrome stainless. To follow the letter of the law, they must dispose of their excess stocks. The irony is that some find few takers for the sheet and chrome stainless supplies because other consumers are in the same position. Result: A few steel users are breaking the inventory regulations, but they can't help it.

"Let Them Sue Me"

The whole problem of compliance with the flood of government regulations is developing into a major headache for metalworking executives. "I can't keep up with all this stuff and attend to my business, too," says an official in a small company. Pricing regulations, especially, exasperate many a small manufacturer. "I ignore 75 per cent of the OPS releases," says one harassed president. "Let them sue me."

Shift in Expansion

Watch for a shift in expansion emphasis over the next six months—from plant additions to equipment additions only. Two reasons account for the change: Much of the plant expansion has already occurred; the structural shortages discourages new construction. That means even more materials help will be going to equipment builders and electrical contractors.

Straws in the Wind

Cleveland hearings of Sen. Blair Moody's subcommittee investigating the steel shortage turned up more daisy-chain operators, but few fresh angles on the situation . . . Cyril Bath Machinery Co. has developed a device to mold the tough alloys, particularly in aircraft production . . . On sale last Thursday in Sears' western and southern stores went the Allstate, a modified version of Kaiser-Frazer's Henry J.

Here and There in Industry

Contemplated are ten more blast furnaces that will add at least 3.1 million tons to America's pig iron capacity by early 1954 (p. 25) . . . Some 80 per cent of structural allotments for first-quarter expansion will go for direct or defense-supporting military production (p. 26) . . . The Labor Scene shifts to Washington (p. 27) . . . In 1952 much of the glitter will be off the appliance business (p. 28) . . . Warehousemen like their new pricing order, CPR 98 (p. 30) . . . Cold Metal Process Co. wins law suits with the U.S., but has yet to collect its $10 million on patent infringement and royalty cases (p. 35) . . . Britain faces materials shortages and other problems that threaten her economy in 1952, but West Germany makes political and economic gains (pp. 36-37).

This is another of the "HUNDREDS OF JOBS" which can be done on a MARVEL Band Saw!

MARVEL BAND SAW saved these two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the 1½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly, and economically, without special tooling, on a standard Model #8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

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Better Machines–Better Blades

These exclusive MARVEL Features made this job easy.

1. Large, T-slotted work table.
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Let's Make It UNANIMOUS

Resolved

to Safeguard National Security

Whereas; all of us depend in one way or another, directly or indirectly, on an adequate supply of steel, in order to sustain a more perfect economy, and to safeguard national security, and

Whereas; in 1952, the Steel Industry will attain its highest producing capacity in history, and

Whereas; only the critical shortage of scrap threatens to stand in the way of the fullest utilization of such capacity,

Now, therefore, be it resolved; that all of us together do mutually pledge to each other our utmost efforts to search out any and all hoards of dormant scrap in and about our establishments, and

Further be it resolved; that we will diligently and promptly turn in all such hoards to the Scrap Mobilization Drive.

In cooperation with the Steel Industry Scrap Mobilization Committee

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NEW YORK 19, N. Y., 250 West 57th St., COlumbus 5-4870
ROCHESTER 4, N. Y., 5 St. Paul St., BAker 1061
ST. LOUIS 8, MO., 4053 Lindell Blvd., LUcas 4558
TOLEDO 4, OHIO, 2114 Ohio Bldg., GArfield 6384
WORCESTER 8, MASS., 339 Main St., WOrcester 5-8686

Road to Ruin

Thus far negotiations between major steel companies and United Steelworkers of America-CIO over a new wage contract have conformed closely to the schedule which has been widely expected.

The union has authorized its president Philip Murray to call a strike Jan. 1. Economic Stabilizer Roger Putnam has stated flatly that the government will not allow steelmakers to raise prices to offset a pay increase. The union is demanding more than is permitted by the present regulations of the Wage Stabilization Board. Steelmakers obviously cannot offer more than WSB regulations permit without obtaining government authorization for such act.

As matters now stand, it is almost inevitable that the case must proceed through the complicated channels of government mediation. If past performance of the government is to be accepted as a guide for action in the steel case, we can expect that Washington's array of boards and bureaus will find a way of granting wages somewhat above those which WSB regulations permit, and then possibly utilize the Capehart amendment or some other device to give steel producers price increases to offset a part of the increased wage burden.

If this happens, we will have gone a long way toward substituting government controls and decisions for collective bargaining. Every reader of this page can remember clearly the vehemence with which union leaders and government officials fought for the principle of collective bargaining only a few short years ago. Today the extent to which the government meddles in almost every detail of the affairs of persons and businesses makes it almost impossible to employ collective bargaining in the way it was intended.

This is but one example of the manner in which undue concentration of power in Washington is slowly but surely destroying the freedoms which are the very foundation of the success of this nation. Perhaps it is too late to do anything to halt the farce into which the steel case is heading, but unless steps are taken promptly and vigorously to reverse the trend of increasing government monopoly on every phase of activity of individuals and corporations, our country is doomed.

TWO PASS 100 MILLION: Two important milestones pertaining to American industrial accomplishment are being passed in December, 1951. By coincidence, the exciting mark of 100 million figures in both. Early in the month the 100-millionth ton of steel produced since the beginning of the year was tapped. Somewhat later in the month the 100-millionth

passenger car built in the United States rolled off of somebody's assembly line without ceremony.

These are impressive achievements. An idea of rate of growth is gained from the fact that more than 25 years elapsed before motordom had built its first 25 million cars. Its second 25 million were produced in about 10 years, its third in 11 years and its fourth in only 5 years. Growth of steel output extended over a much longer period, but in the case of both automobiles and steel, the accelerated pace of recent years is astounding. —p. 44

* * *

BOLTS IN STRUCTURES: Structural steel fabricators are currently interested in the engineering and economic merits of high-tensile steel bolts as compared with those of rivets. There seems to be no serious disagreement in regard to the superiority of high-strength bolts, particularly in structures subjected to widely fluctuating dynamic loads such as bridges and parts of industrial equipment and in those subjected to static loading.

This technological superiority is offset, however, in part by the short supply of high-strength bolts. They are not fully stocked; many are made up specially. Consequently, the cost is considerably above that of rivets. Industrial Fasteners Institute and American Standards Association are working on projects which may remove high-tensile bolts from their present "special order" status. A challenging factor is the report of the American Institute of Steel Construction that use of high-tensile bolts saved 11 per cent in the cost of an eight-story building. —p. 60

* * *

RELUCTANT CONSUMERS: Interviews with manufacturers of household appliances such as refrigerators, freezers, gas and electric ranges, laundry equipment, vacuum cleaners, dishwashers, garbage disposers and radio and television sets indicate that while shortage of materials will be a major problem in 1952, it is by no means the only deterrent to production. Many of these manufacturers feel that the consumer also has to be reckoned with and they point out that he was a "reluctant" buyer in 1951.

As a sample of manufacturers' expectations, makers of electric refrigerators expect to produce 3 million units in 1952, compared with outputs of 3.8 million in 1951 and 5.8 million in 1950. A big question is to what degree the aloofness of consumers, which in 1951 was attributed largely to "a hangover from Korea scare buying," will extend over into the new year. —p. 28

* * *

DOES THE WINNER WIN? There is a certain note of irony in the yearend summaries of economic conditions in Great Britain and West Germany. The former, victor in two world wars, is in sore straits. The latter, vanquished in the same two military contests, is well on the road to industrial recovery.

Britain's plight centers around materials shortages, currency problems and manpower and productivity difficulties. These last two stem partly from socialistic experiments which have dulled the incentive of the individual to exert himself beyond moderate limits. Of course, the toll of waging two major wars has been terrific.

Germany's problems have been simplified by the almost complete repudiation of certain obligations which is permitted a defeated nation. Her exports, which have been mounting, are highly profitable. More important, individual incentives seem to be working fairly well. Comparing the troubles of winner and loser in war, one wonders whether or not the long, drawn out austerity of the victors is more devastating than the short-term rigors of almost total disaster of the defeated. —pp. 36, 37

* * *

TOYS FOR CHRISTMAS: If you have youngsters around your home, you have noticed the great interest they display in today's realistic toys which are miniatures of road-building, excavating and similar equipment. The young lads are pretty well versed in the operations of bulldozers, scrapers, power shovels and dump trucks.

One reason for this is the increased production in recent years of toys which to a certain extent are scale models of the real machines. They are sturdily built of good materials and they embody the major features of the original equipment. One manufacturer of these toys is Charles Wilson Doepke Mfg. Co., Rossmoyne, O. It has adopted mass production methods based largely upon progressive die operations. Each of most components of the 220,000 toys manufactured annually is finished completely on one die. —p. 54

Merry Christmas

E. C. Shaner

EDITOR-IN-CHIEF

To Management:

We suggest you bring this page to the attention of your Purchasing, Production and Maintenance Depts. One or more of its paragraphs may lead to the solution of critical procurement problems in your plant.

Stymied by Steel Shortages?

These 6 Suggestions May Help!

(1) **Handicapped by restrictions on nickel-bearing 18-8 stainless?** If you are, straight chrome stainless may enable you to continue your stainless production. For instance, type 430—the most widely used straight chrome steel—can often be substituted for type 302 in applications subject to mild corrosion. Ryerson offers you the largest and most diversified stocks of straight chrome stainless including types 405 and 430 sheets, type 430 plates and type 416 bars.

(2) **Manufacturers plagued by seamless tubing scarcities** will find that bright-finish, hot rolled welded tubes in 11 gauge and 3/16" walls can often be used as an alternate for seamless tubes in the same sizes. These welded tubes are in good supply at Ryerson in a wide range of round and square sizes.

(3) **If you are having trouble adopting interim and lean alloys** because of the unfamiliar analyses of these new steels, let Ryerson metallurgists work with you. We test all alloys and can assure the hardenability desired. Heat treatment guide with every shipment.

(4) **Faced with the problem of finding workable substitutes for special plate shapes?** You may find the right answer in forgings. You can get complete information on forgings from our sales representative.

(5) **In addition to these alternate steels** we recommend a superior babbitt—Glyco Babbitt Metal—instead of more expensive and restricted high tin babbitt. Product of an exclusive Ryerson formula, Glyco is a lead base alloy with physicals equal to tin base types.

(6) **And, remember**—please give us full information when ordering. For instance, when we know the exact size or length multiple—the cut size or length you will actually use—we may be able to fill your order from smaller pieces or "shorts." Knowledge of acceptable alternates also helps. But, no matter what your requirements, we urge you to check with us. We will always work closely with you—help you get what you need.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

6
5
"How'd you like to save $1.50 on every one of those packages?," asked Ed
Two men stood watching the steel unloading operation. "Say Dave—aren't those 6,000 pound lifts you're using?"
Ed Browning, an Inland "trouble shooter" on shipping and handling problems, was visiting the plant of a large manufacturer of hydraulic hoists and dump bodies. This customer had been ordering 42" x 96" hot rolled sheets from Inland in 6,000 pound lifts. As he stood on the unloading dock with Dave Nordstrom, the customer's purchasing agent, Ed observed that the practice was to remove only a few sheets at a time from the lift because their equipment couldn't handle a complete package that heavy.
"Yes, Ed, those are 6,000 pound packages. Why?"
"I'll bet that's a holdover from old packaging prices. If you can use 10,000 pound lifts, you'll save $1.50 on every package."
"Well," said Dave, "we can soon find out." A check with the receiving foreman confirmed that it would be just as easy to break down five ton as three ton lifts for unloading.
Result: The very substantial saving of $1.50 per lift on the large volume used by this Inland customer. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago 3, Ill.
Names used are fictitious
Inland's interest in your steel problems does not stop at our shipping dock
Your Scrap is Needed by the Steel Industry for National Defense

More Blast Furnaces Planned

Ten new units, in addition to those already under construction, are contemplated in a program that would add at least 3.1 million tons to capacity by early 1954

ON THE FIRE is a plan to build ten new blast furnaces that will add at least 3.1 million tons to America's pig iron capacity by the beginning of 1954. The reason: A scrap shortage forces the need for more metallics, so we must get additional pig iron to fill the gap.

Under a proposal that would involve blast furnace construction in addition to any already in progress, the ten units—with one exception—would be built at smaller plants in the iron and steel industry. If one or two of the producers currently slated for the new blast furnaces expansion eventually drop out because of financing or other problems, other firms will probably be brought in because the U. S. needs 3.1 million additional tons of capacity by early 1954. Even more than that may be planned if the scrap shortage becomes more acute.

Between the Lines—That's some of the more significant news behind the news from the Defense Production Administration that the industry will expand to produce 120 million ingot tons of steel a year by early 1954, 85 million tons of blast furnace products (excluding ferroalloys) by 1954, 84 million tons of coke by 1954 and 15 million gross tons annually of iron ore from taconite as of the beginning of 1956.

Not surprising is the fact that the steel industry will have an effective capacity of 120 million ingot tons yearly by early 1954. The bulk of the expansion will come in 1952 (to bring capacity to 118 million tons one year from now), but some will not be finished until 1953, and by the end of that year theoretical capacity may even be slightly higher than 120 million tons. Effective capacity will be only 120 million because the industry cannot be expected to operate at above 100 per cent potential forever and because some obsolete facilities will be scrapped in the next two years. Nor is the taconite expansion astonishing. That program has been in the works ever since the end of World War II.

The Crux of the Matter—The most uncertain phase of steel expansion has been the blast furnace program and the related coke oven construction. That's because of the uncertainties about scrap. Now that the scrap shortage is developing into a long-range problem, pig iron must carry a heavier load (see STEEL, Nov. 12, p. 50).

BLAST FURNACE EXPANSION
. . . more coming for the long pull

As the proposal now stands, two blast furnaces are planned by Newport Steel Corp. at Newport, Ky., one by McLouth Steel Corp. at Trenton, Mich., one by Colorado Fuel & Iron Corp.'s Worth Steel Co. at Claymount, Del., one by Barium Steel Corp.'s Central Iron & Steel Co. at Harrisburg, Pa., one by Barium's Phoenix Iron & Steel Co. at Phoenixville, Pa., one by Armco Steel Corp.'s Sheffield Steel Corp. at Houston, one by Granite City Steel Co. at Granite City, Ill., one by Pittsburgh Coke & Chemical Co. at Neville Island, Pittsburgh, and one by Bethlehem Steel Co. at Sparrows Point, Md. The Pittsburgh Coke and Granite City projects have been discussed but are now static.

The Common Denominator — One thing involved with all those companies is scrap. All but Pittsburgh Coke are heavy scrap users, and added pig iron would materially reduce their use of scrap. The merchant-iron producing Pittsburgh Coke, by supplying foundries with more pig iron, would also help relieve the scrap situation. Significantly, most of the companies involved in the program will probably have to agree to no more construction of scrap-consuming electric or open-hearth furnaces, to assure that the program will result in a net gain on the scrap shortage.

Here's why pig iron will have to counter-balance the scrap scarcity: To produce 120 million tons of ingots will require 140 million tons of metallics—pig iron, scrap and the iron content of the ore charged into the open hearths. Some 7 million tons of the 140 million-ton goal will come from iron content of open-hearth ore. Not counting the new expansion, our pig iron capacity will soon be 82 million tons. Some 90 per cent of that goes for ingot production, or 73.8 million tons. That means that 69.2 million tons, to be made up by scrap, will still be needed to achieve the metallics goal. Even in the excellent scrap generation year of 1948, the home and purchased scrap totaled only 64.9 million tons. The gap will be narrowed when we get the ten new blast furnaces, because we'll have a pig iron capacity of 85 million tons, or 76.5 million for ingot production. That will mean only 66.5 million tons of scrap will be required for the metallics goal, but even such a total may be difficult to reach; hence, the strong possibility that still more pig iron capacity will be required than the new 3.1 million-ton proposal now pending.

Dark Outlook for Scrap

Scrap supply of mills in the Cleveland-Pittsburgh-Youngstown area is down to the critical point. In the Monongahela valley, 150 open-hearth furnaces have less than a one-day supply. Bethlehem reports scrap reserves dwindling rapidly.

Against this somber background, many business firms and agencies, now made scrap conscious by collection drives, are digging for the material.

The Air Force reports a 31 per cent increase in October scrap metal sales over a year ago. October, 1951, sales amounted to 2446 net tons, of this 2091 tons were iron, steel scrap.

Looking far and wide, too, the Navy came up with a recommendation that 31,000 tons of scrap in the Aleutians area be returned to the United States. Since 40 per cent of this total is scattered and inaccessible, the inspecting Navy survey team recommended selling much of this total through scrap and salvage contracts.

General Motors plants, suppliers

and dealers report collection of 10,432 gross tons of scrap during the last month in addition to production scrap normally returned to the mills. A three-month drive by Westinghouse Electric Corp. brought out 5500 tons of scrap in addition to regular scrap savings of 29,000 tons for the same period. Instead of food in this case, H. J. Heinz Co. shipped 57 varieties, totaling 200 tons, of scrap in three weeks' time from its main factory in Pittsburgh.

The city of San Francisco is planning to scrap-pile discarded steel streetcar rails as a bargaining point in obtaining increased new steel allocations. The city has already placed about 20,000 tons of scrap streetcar rails on the market with no strings attached.

Mill Equipment Reclassified

Many items of blast furnace and steel works equipment will be classed as "A" products, effective in the second quarter. The reclassification covers new equipment only, says NPA. Included in the classification are charging boxes and buckets, slab and billet heating furnaces, charging and ingot cars, ladles and slag thimbles, blast furnace ladle cars, tuyeres, bosh plates, stack coolers and stove valve seats.

Basic Adds Dolomite Capacity

New facilities with an estimated annual capacity of 320,000 tons of dead burned dolomite will be added by Basic Refractories to its Maple Grove, O., plant in a $3.5 million expansion program. Basic's existing facilities have an operating capacity of 480,000 tons yearly. A five-year V-loan will help finance the project.

Galvanizing Plant Underway

Success of a pilot plant operation is spurring Wheeling Steel Corp. to build a $2.5 million continuous galvanizing plant at Martins Ferry, O. Wheeling's galvanizing process is reported to galvanize cold rolled steel with a coating as good as that produced by hot dip process. Cold rolled sheet in coils will be brought to the new plant from Wheeling's Steubenville, O., works for galvanizing in 3000 to 4000 foot lengths. Operations will begin in 1952.

Who Gets Tax Amortization

Producers and fabricators of basic materials are still getting the biggest chunk of accelerated tax amortization approvals, a DPA industrial facilties expansion summary shows. Through Oct. 19, this category accounted for $6,870,000,000—74.7 per cent of the total amount approved.

As of Dec. 10, certificates had been issued to 4,732 applicants on projects having a total value of $10,490,497,793.

Ohio Leads in Fast Writeoffs

Ohio led the parade of states getting certificates of necessity for fast tax writeoffs as of Oct. 19, says DPA. In that state, 421 companies had approvals for $727,062,000. Pennsylvania firms got 405 certificates aggregating $1,246,328,000, and 375 went to California industries on projects costing $366,176,000. Texas (182 certificates for $998,749,000) and Michigan (293 certificates for $653,668,000) were also high in dollar volume of projects approved.

Structural Allotments: 80 Per Cent for Defense

SOME 80 per cent of next quarter's available supply of structural steel for industrial expansion will go into direct military and defense-supporting industries.

So says National Production Administrator Manly Fleischmann in announcing allotments of structurals for the first quarter of 1952 for expansion of industrial facilities. Most of the military and defense-supporting expansion will be in facilities for iron and steel, aircraft, ordnance, machine tool, general industrial equipment and chemical production.

The accompanying table of structural steel allotments is for industrial expansion and general commercial construction only in the first quarter of 1952.

FIRST QUARTER 1952

PROGRAM	Stated Requirements	Allotment	% of request Allotted
		tons	
Aircraft, aircraft accessories, ordnance	88,701	83,756	94.5
Aluminum, magnesium, light metals	26,000	25,656	98.6
Building materials	11,539	4,205	36.4
Chemicals	70,291	32,733	46.5
Consumer durable goods, service equipment	10,540	1,395	13.2
Containers, packaging	11,427	411	3.5
Copper, copper alloys, brass	2,029	1,761	86.8
Electrical equipment	3,213	1,116	34.7
Electronics, communication equipment	4,722	4,620	97.8
Machine tools, general industrial equipment	52,514	32,874	62.6
Iron and steel mill products, ferro-alloys, foundries, refractories	191,454	138,632	72.4
Leather, leather products	204	0	0
Lumber, lumber products	1,156	0	0
Miscellaneous metals, minerals	7,000	6,191	88.4
Pulp, paper, paper board	31,280	10,046	32.1
Railroad equipment	569	0	0
Rubber	8,163	5,770	70.7
Scientific, technical equipment	7,220	2,099	29.0
Textiles, synthetics	19,227	8,781	45.6
Tin, lead, zinc	419	70	16.7
Printing, publishing	777	169	21.7
General commercial construction	61,995	10,030	16.1
Total	610,440	370,315	

CMP Ticket Traffic Jam

Many first quarter tickets are uncashed, says industry, and NPA help is of little effect

ALL IS NOT ROSY in materials procurement and NPA's promise to help any company unable to cash CMP tickets is of little effect.

That's what STEEL found in spot checks to determine industry's success in placing first quarter orders. Many companies contacted haven't been able to cash first quarter tickets. Some have come close, others are short by a good margin.

Reaction—NPA says that less than 20 form 148s—the application for help in placing orders—had been received early last week. It thinks that's an indication that the situation is easing. Industry's reaction to filing form 148 is: "Why bother?" For the most part consumers know about the form and its intent but discount its usefulness. They feel they can do better on their own in shopping around for sources of supply.

Some comments on NPA assistance were explosive but not quotable. Help from NPA so far, say those that have received it, has consisted mainly of referring them to high cost mills with space or conversion tonnage sources. Many of those who will file form 148 will do so with tongue

in cheek, having little confidence in its helping them. Some companies have been told not to file form 148. A locomotive builder says NPA's railroad equipment division suggested it not be filed, but if it was to send it to that division rather than steel products division as the form requests.

Diesel Orders Swell

Diesel locomotive builders added two big Christmas orders to their well-filled backlog stockings and reflected on a third when B & O, C & O, and Erie railroads announced major equipment buying plans. Most significant to diesel builders are orders from Chesapeake & Ohio Railway. Long an advocate of the steam engine (its lines serve many coal mines), C & O is now buying diesel electric locomotives; 149 units are scheduled for delivery by July. Baltimore & Ohio Railroad placed orders for 55 road freight diesel locomotive units costing nearly $10 million for delivery between April and September, 1952. Erie Railroad is placing a $7.5 million order for 42 diesel locomotives and servicing facilities, a purchase that will bring almost complete dieselization over the road's system. A number of the new units will be assigned to the Mahoning division for hauling ore trains from lake vessels to steel mills.

Cameron Earns a 'Well Done'

Delivery of gun forgings regularly ahead of schedule earned Cameron Iron Works, Houston, a 'well done' from the Navy Bureau of Ordnance.

Rr. Adm. M. F. Schoeffel, chief of the Bureau of Ordnance, said: "That the quality of this material has been uniformly excellent and that the favorable prices originally tendered have been voluntarily reduced is indicative of progressive efficiency in production methods."

Cameron Iron Works, now making forgings for Navy guns, also won every type of Army-Navy "E" award for outstanding production records in World War II.

Mallory-Sharon To Move, Expand

Mallory-Sharon Titanium Corp. will move operations in 1952 from Indianapolis to Niles, O., says President James A. Roemer. The one titanium furnace now operated at Indianapolis will be moved sometime during the year and two new ones will be added at Niles, boosting capacity to about 2 million pounds of titanium per year. Sharon Steel Corp., partner with P. R. Mallory & Co. Inc. in the project, operates its Niles Rolling mill subsidiary in the Ohio city.

Labor: The Scene Shifts to Washington

As expected, the U. S. will decide the steel labor case. Odds are that the steelworkers will agree on a truce while some fact-finding board deliberates

THE SEQUENCE of events is going along about as expected in the negotiations between the major steel companies and United Steelworkers of America-CIO.

Last week Federal Mediator Cyrus Ching invited representatives of the 10 major steel producers and the union for a conference in the initial move to bring the government into the dispute (in a chain of occurrences predicted in STEEL, Nov. 12, p. 47).

The Bare Facts—To understand the probable chain of events from now on, you will have to dig beneath the union threats, and the government claims about steel prices that have complicated the negotiations. The union has authorized USA President Philip Murray to call a strike Jan. 1 or after. The union may strike, but it doesn't want to because of public opinion. It hopes the tough talk will alarm the industry and government — especially government—so that a quick and labor-favoring settlement will be reached.

The flat statement by Economic Stabilizer Roger Putnam that the government would not let steel companies raise prices to offset a pay rise is a move by the labor-loving administration to put the industry on the defensive. That statement, like the union threat of a strike, is designed mostly for effect.

OLD, BUT SKILL WORKING: Seventy-four year old George K. Howe takes a minute measurement of an airplane part at Lockheed Corp.'s Marietta, Ga., plant. The template-maker has been retired three times during the past 25 years, but is now helping to fill the need for skilled aircraft workers

To Washington—In such a heated atmosphere, no progress was expected last week in negotiations, even under the benign influence of Mr. Ching. The Wage Stabilization Board—or perhaps some special Presidential fact-finding group—will eventually make wage recommendations. To study the matter will take time, so Washington will ask for a 30 or 60-day truce while the board deliberates. Chances are good, but not certain, that the steelworkers will agree to wait.

In its final recommendations, the board will undoubtedly whittle down the union's total demands which add up to 35 or 40 cents an hour. That includes 15 cents as a basic pay raise, plus 4.5 cents for six paid holidays, 8 cents for vacations and up to 15½ cents, for a ½-cent increase in the present 5-cent differential between job classifications. There are 32 job classifications. The board can make three rulings: Approve a substantial amount and recommend that the steel companies be allowed a commensurate price hike; it can approve a substantial increase, but recommend that steel prices be held or raised only slightly; it can approve a minor wage increase and a minor price rise. If the first alternative is taken, there will be no steel strike, but the entire industrial price system will be cracked. If the second alternative is taken, the steel companies may refuse to grant the wage hikes and the USA will strike. If the third alternative is taken, the steelworkers may strike.

Capehart—A final possibility exists as a variation on that third alternative. A deal may now be on the fire with OPS whereby the Capehart amendment to the Defense Production Act of 1950 can be stretched a little for the steel industry so it could win price increases to cover an 8 or 10 cent wage boost. Last week OPS was talking Capehart adjustments with at least five steel executives.

Guns: Aircraft-Type

Savage Arms Corp., Utica, N. Y., reports that it has received a $5 million contract for the manufacture of parts for aircraft machine guns.

Glitter Gone From Appliance Business

Even with '52 volume at 60 per cent of the '50 level, shortages on retail levels are unlikely. Production will depend on metals supply, alternate materials, consumer demand

"WE CALL IT the case of the reluctant consumer," says a refrigerator maker in commenting on the appliance situation.

While materials allowances will largely determine 1952 output, the consumer still must be reckoned with. His buying inclinations will be a big factor in every appliance maker's production equation, though not so much as in 1951's sales slump or in 1953 when metals supply eases. Because the public didn't buy this year, stocks of appliances going into the new year are well above normal and there's a good chance shortage on the retail level will be averted.

Prophecy—Next year, household appliances, regarded officially as froth for the civilian economy, will be limited to roughly 50 per cent of their 1950 materials use. "We'll still have to sell what we make," comments an electric range manufacturer. NPA Order M-47B (allowing controlled materials to be shifted from one product to another in the same classification group) is already being used extensively, will get a bigger workout next year as producers cut down on overstocked appliances in favor of the fast-moving ones.

Here's how most appliance makers expect to do in 1952: First quarter, unitwise, will be about the same as this year's fourth quarter; second quarter will be a shade under the first; third and fourth quarters will see volume swell and the greatest chance for shortages to develop.

Record — Output of major appliances in 1951 will be almost 25 per cent below 1950 levels—and materials restrictions don't account for the entire drop. Rather than add to already heavy stocks of finished goods, many appliance makers squirreled away vital components in case demand picked up later.

First quarter allotments cut down on just the metals appliance makers need most—and NPA promises another severe slash in the second quarter. That will mean another 20 per cent production drop in 1952—over and above the 25 per cent lost this year.

Aloof—The consumer's remarkable aloofness this year started sales slumping in the first quarter. They hit rock bottom in the third and production slipped nearly to the level of the 1949 repression. Demand perked up a bit in the fourth quarter, but pre-Christmas sales, as a sounding board for '52, were discouraging.

Promotions, price trimming and relaxation of credit regulation W whetted the consumer appetite only slightly. One appliance maker explains it this way: "There were few hot lines this year." Some exceptions to the slow-buying rule were automatic washing machines, clothes dryers, food freezers.

Pessimism—Some forecasters say the 1950 buying boom won't be repeated for seven or eight years, pointing to the fact that spending for household durables is falling off from the postwar average of 67 per cent of disposable income towards the prewar rate of 61 per cent, and signifying the end of the postwar replenishment boom. One producer blames it on "a hangover from Korea scare buying and bum guessing on our part about promotion needed to move goods." Such factors as housing cutbacks, excises and high income taxes undoubtedly hurt appliance sales.

Most appliance makers still have plenty of raw materials in private stockpiles, A. M. Lewyt of Lewyt Corp. points out. Still, production will depend on ingenuity in adapting alternate materials to their products. Westinghouse appliance division's J. A. Ashbaugh says nickel in general will control production of appliances with heating elements, copper wire those with motors. Alternates for these two materials are limited, but a number of other substitutes are in use.

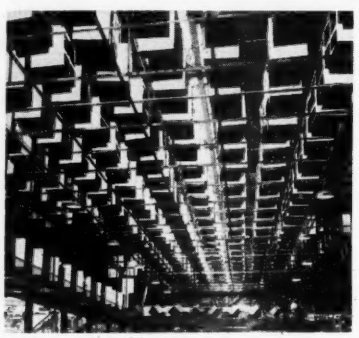
Practice—C. G. Franz of Apex Electric says reinforced fiber glass has shown considerable promise in replacing steel, zinc and aluminum in washing machines. Seamless steel tubing is being used in place of copper for gas stove lines and refrigerator coils. Nickel content of range heating elements has been halved; one manufacturer switched to 2512 stainless for sheathing.

Here's the 1952 outlook for major appliance groups:

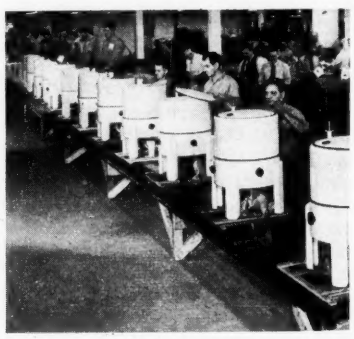
Refrigerators & Freezers—Pioneering days are over for refrigerators, just beginning for food freezers. With distributor stocks of refrigerators at nearly 1 million units and the big selling season as far off as warm weather, there's little likelihood of a shortage on consumer levels in 1952. Lack of new owner potential is pointed up by Servel Inc.'s W. Paul Jones, who suggests that refrigerator manufacturers push for "two refrigerator homes" because more than 40 million homes in the country already have automatic refrigeration. From 62 to 65 per cent of those in use are postwar models. Production of electric refrigerators in 1952 will approximate 3 million units; 1951 totals will show about 3.8 million units built, compared to 5.8 million in 1950.

Freezer demand, says Hotpoint's Edward R. Taylor, has held strong with the high costs of food, and creates the fourth rank in appliance sales. It is one appliance that should show a production increase in 1952. Output this year will be about 770,-

WESTINGHOUSE ELECTRIC CORP.
. . . insulating refrigerators



HOTPOINT INC.
. . . overhead network of ranges



APEX ELECTRICAL MFG. CO.
. . . long line of washing machines

000 farm and home units—up sizeably from 1950's 645,000.

Gas & Electric Ranges—One reason why new ranges aren't selling: Of the 8 million electric units now in use, 6 million are five years old or less. Gas ranges (they traditionally account for about 60 per cent of all units made) are in a better position materialswise than electric ranges. Gas Appliance Manufacturers Association figures show the average modern gas range requires only 1.3 pounds of copper and brass, 1.7 pounds of aluminum and 0.4-pound of nickel. Gas range volume in 1952 will approximate 1.8 million units. This year's yield will be almost 2.4 million, over 600,000 units fewer than in 1950. Electric range production will progress downward in 1952 to about 900,000 units from a little under 1.3 million this year and 1.6 million in 1950.

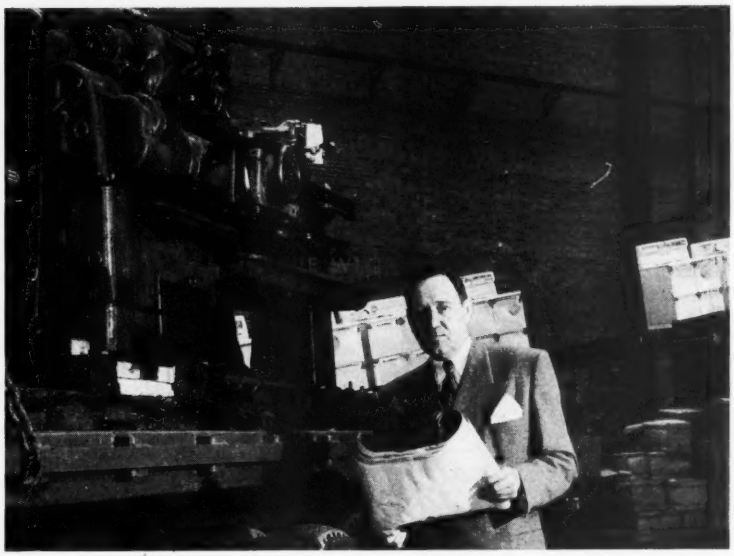
Laundry Equipment—At a Washington meeting with NPA this fall, home laundry equipment makers estimated the nation's minimum annual needs at 2,971,000 washers, 220,000 ironers, and 360,000 dryers. That's about 70 per cent of the pre-Korea rate. Beam Mfg. Co.'s George P. Castner, president of American Home Laundry Manufacturers Association, says his industry will be lucky to turn out 50 per cent of the units they made before Korea. Sales billed for all types of washers this year will be close to 3.3 million units, off almost 1 million units from 1950. About 290,000 standard-size ironers were made in 1951; 410,000 were sold in 1950. Automatic tumbling dryer sales this year amount to about 500,000 units, will over the 318,500 of 1950. Of this group, only the dryers will be produced in greater quantities in 1952—at the expense of fewer washers and ironers.

Vacuum Cleaners — Spring could easily see shortages in vacuum cleaners, says George H. Scott of Scott & Fetzer Co. Copper for motors, at 35 per cent of base period, will control production, he believes. Tank type cleaners can almost eliminate aluminum, but not the upright models. Production outlook is for close to 2 million vacuum cleaners next year; an estimated 2.7 million were made this year, 3.5 million in 1950.

Electric Housewares — Roasters, toasters, food mixers, flat irons, grills, hot plates, waffle irons and broiler attachments will all be hard hit in '52. Rough estimates put production of most of them at less than 50 per cent of 1950 output. Plastics have always flourished in appointments of the small appliances. They'll be used even more extensively next year.

Dishwashers, Garbage Disposers—Such new appliances as automatic dishwashers (there are over 1 million in use today says Hotpoint) are at the bottom end of the saturation curve and will be found an increasingly profitable market to be developed. Corrosive-resistant parts will be a limiting factor in production. General Electric found it could substitute a rubber phenolic compound for brass screening in an interior part and improve performance. Waste disposer units use a lot of stainless, and that material will cripple production next year.

MUCH of the flashing trim on home appliances has already been outlawed. The industry that produces them, considered mere ornamentation in a mobilizing economy, will get less materials next year. But the shortage of customers that depressed '51 business may still be around to haunt producers in '52.



FILLING THE GAP: Best way to maintain operations, appliance makers find, is to line up plenty of defense work. In Hotpoint's new $22 million Chicago plant, president James J. Nance inspects layout for producing jet engines. Jet work will help balance lowered volume of such items as ranges in background

Radio, Television—Fall-winter sales revived this industry from summer hibernation. With a fair balance of parts and heavy backlogs of units gathering dust in warehouses, there should be plenty of radio and television sets available next year. Production of TV sets in '52 will be closer to the government estimate of 4 million sets than the industry members prediction of 4.4 million. That would be almost 25 per cent below 1951 output and a little over half of 1950 production. Radio sales, about 20 per cent lower than last year, haven't suffered as badly as television sales. In 1952, production will be close to 10 million home sets, portables and auto sets; 1951 output will be just under 12.8 million which is almost 3 million units below the 1950 level.

Appetite For Metals

Defense will take 40 per cent of steel, 60 per cent of copper and aluminum in first quarter

FIRST quarter defense and defense-related needs will swallow more than 40 per cent of the total carbon steel available and about 60 per cent of the aluminum and copper wire and brass mill products, says DPA Administrator Manly Fleischmann. Screened requirements for all controlled materials were over 150 per cent of first quarter supply.

Virtually all of the higher grades of alloy steel are going for defense. Total defense and support requirements are for 52.7 per cent of the 1.6 million product tons DPA estimates will be available. Highest percentage take by the military is in carbon structurals—66.2 per cent of 1,425,000 ton

estimated supply. Of the 620 million pounds of aluminum available in the second quarter, only 40.2 per cent will be left for civilian use. This doesn't take into account added supplies coming from Great Britain though.

Here's the rundown on defense and defense-related use of other controlled materials:

Carbon steel—42.1 per cent of the estimated 19,385,000 product tons available.

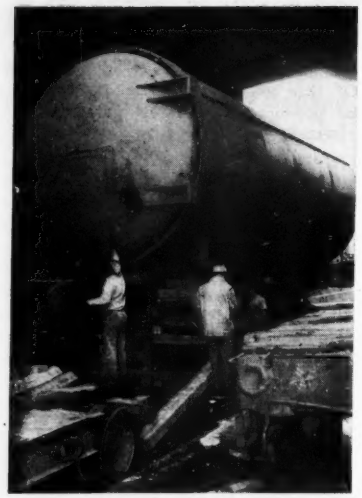
Plate—56.2 per cent of the 2.3 million tons supply. The ratio is even higher in heavier sizes.

Stainless Steel—58.9 per cent of the 280 million pound supply. Virtually all of the nickel bearing stainless will go for defense needs, little of the chrome stainless.

Copper Brass Mill Products—Supply estimates not available, but 58.1 per cent of allotments or 449,494 pounds will be taken for defense.

Copper Wire Mill Products—56.8 per cent of the 360 million pound supply.

Copper Foundry Products — 41.8 per cent of the 290 million pounds available.



SO BIG, SO ROUND: This 40-ton steel cylinder is shown on its way from Struthers-Wells Corp., Titusville, Pa., to the B. F. Goodrich plant in Akron, O. Known as a vulcanizer, the huge cylinder is 12 feet in diameter and 28 feet long, and will be used for vulcanizing large size fuel cells for airplanes

Midwest Procurement Display Coming Up in January

ANOTHER ARMED FORCES Procurement Display will be held Jan. 8, 9 and 10 for the benefit of small business firms in Minnesota, North Dakota, South Dakota, northern Iowa and western Wisconsin at the Minneapolis Armory, Minneapolis.

More than 3500 invitations are being sent out to manufacturers throughout the Upper Midwest to meet with approximately 60 prime contractors who have items available for subcontract. This display will follow the plan developed in other regional subcontracting programs. The businessmen are urged to bring with them complete information and specifications of their plant and facilities, when they come to meet with engineering, production and contracting representatives of the prime contractors.

Contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
90mm Shot and Metal Parts	Carboloy Dept., General Electric Co., Detroit
Cluster Adapters, M16A1	Douglas & Lomason Co., Detroit
Howitzer Motor Carriages	American Car & Foundry Co., New York
Twin 40mm Self Propelled Guns	American Car & Foundry Co., New York
Modification Kits for Aircraft Rockets	Doehler Metal Furniture Co. Inc., New York
81mm Shells	Simmons Co., Elizabeth, N. J.
57mm Canisters	National Silver Co., Taunton, Mass.
Hand Grenade Fuses	National Fireworks Ordnance Corp., West Hanover, Mass.
Metal Parts for 57mm Shells	Monroe Auto Equipment Co., Monroe, Mich.
Dual 40mm automatic guns and spares	Pontiac Motor Div., General Motors Corp., Pontiac, Mich.
Bomb Bursters	Federal Explosives Inc., Bear, Dela.
81mm Shell Fins	Schaible Co., Cincinnati
75mm Steel Shell Bodies	Dresser Mfg. Div., Dresser Industries Inc., Bradford, Pa.
75mm Steel Shell Bodies	American Brake Shoe Co., New York
Shotgun Shells	Western Cartridge Co., East Alton, Ill.
76mm Gun Tube Forgings	National Forge & Ordnance Co., Irvine, Pa.
Turret Bodies, Machined and Assembled	Union Steel Castings Div., Blaw-Knox Co., Pittsburgh
30 Cal. Blanks	Midwest Walnut Co., Council Bluffs, Iowa
Lathes & Grinders	Landis Tool Co., Waynesboro, Pa.
Vertical Turret Lathes	Bullard Co., Bridgeport, Conn.
Engine Lathes	Lehmann Machine Co., St. Louis
Cargo Trucks	Hobbs Mfg. Co., Fort Worth, Tex. GMC Truck & Coach Div., General Motors Corp., East Pontiac, Mich.
Air Compressors, Mounted	Worthington Pump & Machinery Co., Chicago Davey Compressor Co., Kent, O.
Road Rollers	Galion Iron & Mfg. Co., Galion, O.
Steel Steam Tanks, Mounted	Vic Mfg. Co., Minneapolis
Railway Cranes	Industrial Brownhoist Corp., Bay City, Mich.
Diesel-Electric Locomotives	General Electric Co., Philadelphia, Pa. Baldwin-Lima-Hamilton Corp., Eddystone, Pa.
Bridge Erection Boats	Snap-Tite Inc., Union City, Pa.
Space Heaters	American Stove Co., St. Louis
Space Heater Smoke Jackets	Prentiss Wabers Products Co., Wisconsin Rapids, Wis.
Range Finders	Ternstedt Div., General Motors Corp., Detroit
Direction Finders (2 contracts)	Bendix Aviation Corp., Towson, Md.
Components of Compass System	Sperry Gyroscope Co., Sperry Corp., Great Neck, L. I., N. Y.

They Like It

Steel warehousemen say their new price order, CPR 98, "is the best yet seen"

"ONE OF the best pricing orders we've ever seen."

That's the consensus among steel warehousemen when STEEL asked their reaction to the new regulation for their industry, CPR 98.

If Controls Are Necessary—Most warehousemen say that if one must have a pricing regulation then CPR 98 should be the model. "It's comprehensive, well thought out and as fair as any such order could be," one prominent man in the industry says. The novel feature about the order that pleases the most is the monthly adjustments permitted. They will enable warehousemen to change their prices automatically and quickly after any shift in mill prices, freight rates or other allowable costs.

The only serious dissatisfaction with the order is found in the New York metropolitan district where warehousemen such as Oliver Lanchantin, general manager of J. K. Larkin Co., New York, point out that the wire products markup for that area is only 20 per cent, against 35 per cent formerly. A new ruling on wire products markups may be made for New York.

Few Raises—Few prices are raised by the regulation. A great many are lowered slightly, an average of 1 to 2 per cent. The rollbacks are mostly on carbon products, and they average about $2 a ton. The Eastern Seaboard has the advantage of more boosts than most other areas, but even its average is a decrease, about $1 a ton. Under the new regulation, freight rates will become more important than ever.

The regulation will force no legitimate warehouse out of business, but it won't put an end to the gray market, either, unless it is well enforced.

Airplane Engines by Atom!

An Air Force atomic aircraft engine contract has been awarded to Pratt & Whitney Aircraft Div., United Aircraft Corp. The U. S. Atomic Energy Commission will co-operate with Pratt & Whitney on the development program.

United Aircraft Corp.'s research department played a role in the original postwar study of the possibilities of utilizing nuclear energy for aircraft propulsion. This activity was sponsored by the Air Force and the Atomic Energy Commission.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

MACHINE TOOLS—Preferential status on orders for controlled materials and component parts was established for the machine tool industry. The new procedure provides a program symbol "Z-2." This symbol will have the same urgency status as the present symbols A, B, C and E, which identify programs of the Defense Department and the Atomic Energy Commission. The action was taken Dec. 11, 1951, by amending Direction 1 to NPA Order M-5 (aluminum), Direction 2 to M-11 (copper), Direction 3 to M-1 (iron and steel), and NPA Regulation 2 (priorities).

OIL AND GAS—NPA Order M-46, which establishes procedures for U. S. and Canadian oil and gas operators in getting priorities assistance for purchases of controlled materials, was revised extensively Dec. 12, 1951. Supplement 1 to M-46 was revoked.

CANS—Direction 2 to NPA Order M-25 requires can orders placed under NPA directives, DO-rated orders and basic quarterly quotas to be scheduled ahead of orders representing carryover requirements. After a manufacturer has satisfied these current requirements, he must distribute the additional supply of cans proportionately among all of his customers who have placed orders representing carryover quotas. Direction 2 was effective Dec. 12, 1951.

RUBBER — Amendment of Dec. 14, 1951, removes on Jan. 1, 1952, the restrictions on government-produced general purpose synthetic (GR-S) rubber and on the consumption of total amounts of new rubber.

CHROMIUM, NICKEL—Schedule C to NPA Order M-80 prohibits melting, processing, fabricating, delivering or using the type of material described in the schedule's tables with a higher nickel or nickel plus chromium content than are authorized in the tables. No person placing orders for material to be used for any purpose indicated in Schedule C is permitted to specify temperature requirements beyond those necessary for their final operation. Schedule C was effective Dec. 17, 1951.

ALUMINUM SCRAP—Amendment of Dec. 17, 1951, of NPA Order M-22 provides that no owner or generator of aluminum scrap may deliver within three consecutive days 20,000 or more pounds of aluminum scrap to a dealer unless he reports the transaction to the National Production Authority on Form NPAF-152. The owner or generator must furnish two copies of the report to the dealer, and the dealer must fill out one of the two copies and mail it to the NPA when he delivers the scrap to a customer. The amendment was effective Dec. 17, 1951, and aims to assure a flow of aluminum scrap to producers, smelters, reclaimers and fabricators whose inventories are reported precariously short.

COPPER RAW MATERIALS—Amendment of Dec. 17, 1951, of NPA Order M-16 authorizes the NPA on and after Jan. 1, 1952, to direct the distribution of all copper raw materials, including intermediate shapes and refined copper, as well as copper scrap, to users. Formerly, this authorization extended only to copper scrap.

NPA Directive

ALUMINUM SCRAP — A directive issued Dec. 14, 1951, by NPA's Aluminum and Magnesium Division limits the amount of tolled and purchased scrap and secondary ingot which primary producers may receive during the first quarter of 1952, basing receipts on the historical use of aluminum scrap in the industry. Secondary aluminum smelters have been drying up, partly because of purchasing by primary producers.

NPA Regulation

INVENTORIES—Amendment of Dec. 14, 1951, of NPA Regulation 1 lifts inventory restrictions from five materials because of improved supply conditions and places tighter limitations on inventories of 19 other items in short supply. Among those placed under tighter controls are certain steel products.

STINGERS FOR U.S.: Being readied for flight, these Air Force F-89 Scorpion all-weather interceptors are lined up at Northrop Aircraft Inc.'s facility at Ontario International Airport, Ontario, Calif. Scorpions are rolling from Northrop's Hawthorne, Calif., production lines in rapidly increasing numbers

Price Regulations

USED MACHINERY — Ceiling Price Regulation 105 issued Dec. 12, 1951, covers sales of used industrial and construction machinery and related equipment. CPR 105 was effective Dec. 17, 1951.

MACHINERY—Amendment 1 of Supplementary Regulation 3 to Ceiling Price Regulation 30 authorizes manufacturers of specified machinery and related products to defer at their option the effective date of CPR 30 until further action by the Office of Price Stabilization. Amendment 1 was effective Dec. 13, 1951.

ADJUSTMENTS—Changes in regulations under which manufacturers may obtain adjustments in their ceiling prices were made Dec. 14, 1951, by the following: Amendment 3 to General Overriding Regulation 10; Amendment 25 to Ceiling Price Regulation 30; and Amendment 36 to CPR 22.

EXEMPTIONS — Amendment 10 of General Overriding Regulation 9 of the Office of Price Stabilization exempts from price control domestic antimony ores and concentrates, graphite foundry facings and synthetic crystals. Amendment 10 became effective on Dec. 19, 1951.

TANKS—Amendment 3 of Supplementary Regulation 3 to Ceiling Price Regulation 30 authorizes manufacturers of fabricated standard-line pressure and nonpressure, lined and unlined tanks to elect not to determine ceiling prices under CPR 30 and to continue to price under the General Ceiling Price Regulation until a tailored pricing regulation for these commodities is completed. ary Regulation 3 to Ceiling Price Regu- Amendment 3 was issued on Dec. 17, 1951.

TERRITORIES — General Overriding Regulation 23 issued Dec. 18, 1951, by the Office of Price Stabilization provides that none of its regulations heretofore issued applies to any of the territories and possessions of the United States, except Alaska, Guam, Hawaii, Puerto Rico and the Virgin Islands.

SCRAP—Amendment 6 of Ceiling Price Regulation 5 permits certain operators of basic open hearths and blast furnaces to apply to the Office of Price Stabilization for authority to pay established ceiling prices for certain premium grades of electric furnace and foundry scrap. Certain consumers purchasing Grade 30 hard steel scrap also are permitted to apply to OPS for permission to pay the established premium ceiling price for this grade. Also, the differential for Grade 30 hard steel scrap has been reduced from plus $5 to plus $3 over the base grade price. Amendment 6 is effective Dec. 24, 1951.

DPA Regulation

PROPERTY CONDEMNATION—Defense Production Administration Regulation 3 issued Dec. 11, 1951, establishes the procedure to be followed by government agencies in requisitioning or condemning all kinds of property urgently needed for the defense effort should such action become necessary. DPA explained that this procedure is to be used very sparingly.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The Marshall Plan helped this country too: 70 per cent of the funds were spent here. Another such plan may be launched after defense needs wane to bolster business

MEASURED by three criteria, the Marshall Plan, now succeeded by the Mutual Security Program, has easily lived up to expectations. It played a big part in putting western Europe back on its economic feet, it helped halt the westward march of communism, and it returned much of the money invested in it to this country in the form of spending for goods and services. The government thinks it worked so well that plans are underway for another such program to start after defense needs taper off.

Real production in the 17 European countries that participated in the Marshall Plan now stands at 44 per cent above prewar. This great improvement in the economic condition did more than anything else to halt the Iron Curtain's ominous glide through Europe.

Balance Sheet—Cost of the Marshall Plan—$12 billion—can't be called money down the drain even if ideological factors aren't considered. About 70 per cent, or $8.4 billion, was spent in the U. S. for goods and services. As a by-product alone, it meant money in the coffers of thousands of firms and helped pay wages of hundreds of thousands of workers.

An ECA survey of funds spent in Pennsylvania shows the importance of this by-product to just one state. In one three-month period Marshall Plan orders valued at $31.7 million were placed with firms in 91 Pennsylvania cities. To cite a few examples, Reading furnished textile machinery, Waynesboro machine tools, Wilkes Barre steam traps, Zelienople foundry molding machines, Wilmerding air brakes, Willow Grove testing machines, Pottstown tapping machines, Phoenixville grinding wheels, West Chester air compressors, Harrisburg gas cylinders, Dubois soot blowers.

Details of a bigger, better program must be worked out but the basic concept is this: The United States has become deficient in many materials that must be imported; the dollars thus expended abroad must be brought back home in return for exports. Most of this planning is concentrated in Mutual Security Agency, successor to ECA, but some 20 departments and agencies of the government have a hand in it.

DEPUTY DIRECTOR: Paul B. Andrews, appointed Deputy Director of the Copper Division, National Production Authority, is on loan to the government from Revere Copper & Brass Co.

"Shamefully Ignored" . . .

"Virginia manganese possibilties are being ignored shamefully," wrote Rep. Burr P. Harrison (Dem. Va.) last week to Jess Larson. He wants the Defense Materials Procurement Agency, which Mr. Larson heads, to launch an ore-buying program in that state, similar to that setup by DMPA in Montana and New Mexico. DMPA regards Virginia manganese deposits as small and of low grade.

Inside Dope On the Outside . . .

General Services Administration now has 11 field offices to supply prospective bidders on government contracts with information about requirements. They'll supplement regional and district offices of the armed services and the Commerce Department. At these offices you can find how to deal with the government, where to look for government business and the specific requirements of products that you can manufacture. The GSA offices rendering such services are located at Boston, New York, Washington, Atlanta, Chicago, Kansas City, Dallas, Denver, San Francisco, Seattle and Los Angeles.

Busting Out With Boron . . .

Boron-treated low alloy and carbon steels, as substitutes for alloy steels, are being used increasingly by consumers — with some highly satisfactory results reported to NPA. Output of boron-treated steels is estimated at 44,445 net tons in December, will be upped further in January. The following companies now are producing boron-treated steels: American Steel & Wire Co., Bethlehem Steel Co., Copperweld Steel Corp., Crucible Steel Co. of America, Jones & Laughlin Steel Corp., Republic Steel Corp., Rotary Electric Steel Co., Sheffield Steel Corp., Timken Steel & Tube Co., United States Steel Co., Wisconsin Steel Co. and Youngstown Sheet & Tube Co.

DIRECTOR: Timothy A. Lynch, named Director of the Aluminum and Magnesium Division, National Production Authority, has spent his entire working career in the aluminum industry

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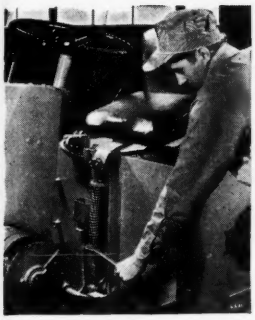

Electric dynamic braking saves wear on brake linings and protects drive axle and other moving truck parts by smoother, safer deceleration. Service brakes can be adjusted in 5 minutes, and relined in 30 minutes.

Baker exclusive Worm Drive Power Axle has fewer moving parts, is less subject to wear and does not lose efficiency with heavy loads or after long use. Mast assembly can be removed in 20 minutes and power axle pulled in 40 minutes.

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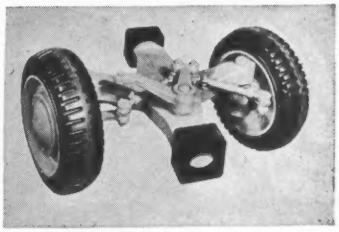

The above are 4 of the 60 illustrations from the new 16-page picture-story manual "Care and Maintenance of Industrial Trucks." *Write for your copy today.*

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Pyrrhic Victory?

Cold Metal Process wins law suits with the U.S. but has yet to collect its $10 million

WHEN does a company win a lawsuit with the government?

Cold Metal Process Co., Youngstown, is asking itself that question now. It won a suit in 1945 in an extended litigation that supposedly would have given the company $10 million in tied-up royalties and settlements on its patented process for cold rolling steel.

New Angle—But after winning that case, the Bureau of Internal Revenue ruled that the $10 million was income in 1945 and subject to taxes. Judge Arnold Raum, of the federal court of tax appeals in Cleveland, has just ruled in favor of Cold Metal, mainly because the company didn't get its hands on the money that year.

And now the court will have to decide whether it is taxable in 1949, as the bureau now claims—because it did get the money temporarily that year. Meanwhile the money is still tied up in the litigation and is drawing interest at six percent from Uncle Sam. That means over $2,000 a day.

Once Upon A Time — The affair goes back 30 years ago when A. P. Steckel and Howard S. Lamb got together one evening and decided they had the answer to a problem of successfully cold rolling steel. They laid out their idea on Lamb's dining room table, perfected it in Steckel's garage.

The development was patented as the Steckel Process and Cold Metal Process was formed to exploit it. After some years, Cold Metal won a settlement from Carnegie-Illinois Steel, and some other companies began paying royalties. Cold Metal one year paid $750 in dividends on the stock that once was offered at $50 a share.

Stock Changes—Now the patents have expired. Cold Metal Process stock has been turned over to the L. A. Beeghly Foundation, a charitable, educational and religious foundation. It stands to get large sums of money from the settlement of the suit and also in settlements of other patent infringement suits.

Export License Dates Pushed Up

Dates for filing license application covering second quarter, 1952, exports of CMP copper and aluminum are two weeks earlier—Dec. 15 to 31, 1951, the Office of International Trade announces.

NPA's Sickle Cuts Down the Cycle

THE BRIGHT, SHINY, new bicycle is one of the hardest hit victims of the war mobilization economy.

Bicycle makers report that cuts in their first quarter, 1952, allotments will mean almost 50 per cent curtailments in output of new bikes and replacement parts. Similar reductions, percentagewise, are predicted in the industry's labor force.

Meeting with the NPA, the Bicycle Manufacturers Industry Advisory Committee said the industry's inventories are virtually exhausted, that the continuing cuts in steel allotments will create industry hardships.

Problem of Workers—The committee pointed out that the bicycle industry requires special skills in such processes as wheel-bending and frame welding. Workers are traditionally in the upper age brackets. Employees average between 45 and 50 years of age and 15 years employment in the industry.

The 10 manufacturers of bicycles and 68 makers of replacement parts normally employ about 80,000 persons. They turn out about 2.5 million bicycles a year and estimate there are now about 20 million bicycles on U. S. streets—and sidewalks.

How to find jobs for the 40,000 persons who will be forced out of work by the latest cuts in allotments will be a major problem.

Can It Convert?—The NPA is seeking to find out whether the industry as a whole can turn to defense or defense-supporting production. Currently, only 2 per cent of the industry's productive capacity is devoted to that type of manufacture, although every one of the 10 makers is actively seeking defense contracts.

During World War II, the bicycle industry made such military items as 20mm and 40mm shells, bazookas, radar frame assemblies, bucket seats for aircraft, fuse bodies, and other items of a tubular nature. At present it is almost impossible to obtain contracts because all the big manufacturers have them and are not subcontracting them, according to the committee.

CAST ARMOR GIANT: The nation's largest steel foundry, the government-owned cast armor plant at East Chicago, Ind., soon will start deliveries of heavy tank hulls and turrets under a multi-million dollar contract. Awarded to American Steel Foundries by the Chicago Ordnance District of the Army, the contract covers the reactivation and operation of the property. The plant includes the foundry, two heat treating and cleaning and finishing buildings, boiler house and commissary

Britain . . . Resigns Herself to Another Year of Shortages;

Plagued by shortages of steel, which can be traced backward to lacks of pig iron, scrap and forward to diminishing end product, Britain faces more materials problems in 1952

OF ALL the things that happened to Britain in 1951, two events stand out: Mr. Churchill became prime minister; the economy took a beating from the rearmament program. The events are related, of course, and the question is: In 1952 can Mr. Churchill weather the storms that materials shortages and other economic problems resulting from rearmament are sure to generate.

In early 1951 materials shortages were not so noticeable because often the scare items could be taken from stockpiles. By fall, not only were stockpiles seriously diminished, but there had also been a definite shrinkage in production due to lack of raw materials.

Missing The Target—The 17.9-million-ton goal for steel production in 1951 was out of the question as production slipped badly in the third quarter, and kept slipping. In October, the steel production rate fell to an annual rate of 17,504,480 tons compared with a 17,638,480 ton annual rate in September, and 19,084,800 ton rate in October, 1950. Production for eleven months of 1951 was 16,226,560 tons of steel compared with 16,919,840 in the like period of 1950.

Steel production is just one link in a chain which has many weak points. The reason that steel production has been below expectations is the lack of pig iron and scrap. Behind the shortage of pig iron is another shortage of iron ore and scrap.

Looking Backward—Scrap imports in 1951 are not likely to exceed one-third of the 2 million tons imported last year. Although domestic scrap drives have had good results, British industry cannot continue successfully without importation on a large scale.

Semifinished steel imports are still much below the level of 1950, but there was a big increase in the purchases of pig iron from abroad. Iron ore supplies improved late in 1951, but were not of much immediate benefit in the absence of coke to operate extra furnaces.

Looking Forward—Looking in the other direction in the chain of events from the slipping steel production, the hydra-headed monster, shortage, still plagues most of British civilian metalworking industry. At a time when civilian users desperately need steel in order to maintain their export markets, defense work is taking bigger quantities of raw materials each month.

The automobile industry is particularly affected by the shortage of steel, and is in danger of losing its position as Britain's premier exporting industry. Hopes that the opening of the giant steelworks at Margam in South Wales would give the auto industry all the sheets it wanted have not materialized because that works is not yet in a position to operate at capacity.

Fewer Autos—Already some of the auto firms have reduced their working week and there is no hope of an early improvement in the supply of raw materials. For the fourth quarter, 1951, the allocation of sheet steel to the industry was 85 per cent of its consumption in the fourth quarter of 1950.

The drop-forgings industry is seriously handicapped by the shortage of steel, and the largest user of drop forging components is the auto industry which takes about 60 per cent of drop-forging output.

One of the first industries to send a productivity team to the United States, the drop-forging industry has not applied many of the technical lessons learned here through a lack of machinery, lack of parts for maintaining what they do have, and the lack of steel.

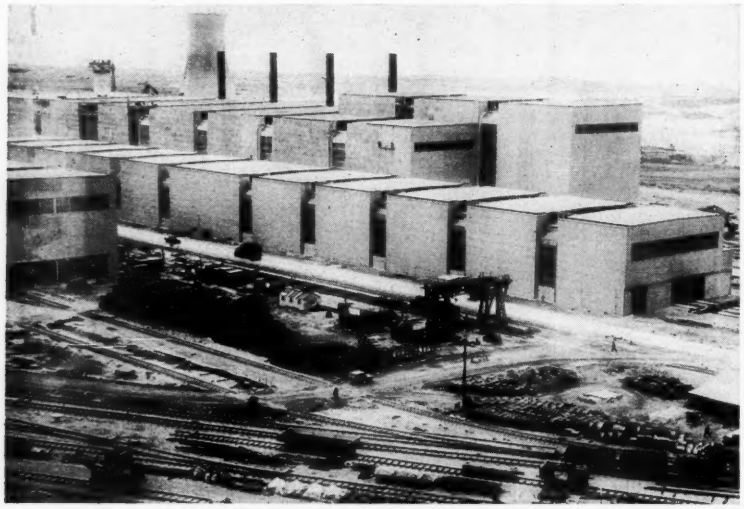
Before the squeeze in steel, this industry consumed about a half-million tons annually, representing about 350,000 tons a year of finished drop forgings. Since May, 1951, it is estimated that there has been a drop of about 20 per cent in output.

A prolonged fuel shortage in Britain is feared. Labor continues to drift from British mines—in South Wales men have been leaving at the rate of 100 a week and there is a similar exodus in other coalfields.

Steel Shortage Again—Despite the progress which was made with construction of electric power plants, there is not enough electricity to meet demand, and load shedding is forecast for as long as five years ahead. The work of building power plants and equipment is being delayed by the shortage of steel.

One industry in which Britain is not losing her first rank is shipbuilding. In September, there were under construction 1202 steamers and motor ships in the world (excluding China, Poland and the U.S.S.R.) totaling 6,120,242 tons. Of this tonnage, 41.6 per cent was being built in British yards. This was 176,200 tons more than at the end of June, 1951, and the highest total since December, 1921.

Different Shortage—Metalworking industries, in particular, are plagued with another kind of shortage—manpower. This is destined to be one of the biggest problems for Britain in 1952, and there is speculation whether the old wartime Control of Engage-



MARGAM STEEL WORKS, SOUTH WALES
. . . less than full production disappoints British auto industry

Production Is Key Word in . . . *West Germany*

Increased production and a little horsetrading is bringing West Germany well along the road to industrial recovery. To finance expansion she turns to mutual investment plans

HERE are two more articles in a series on the economic pasts, presents and futures of the major European countries. On Dec. 10 we wrote about Italy and Sweden, on Dec. 11 about France and Belgium. Next week we conclude the series with a summary of the situation in Western Europe. Complete iron and steel statistics for all industrial nations of the world will be carried in the 1951 Metalworking yearbook issue, Jan. 7.

ment Order will be revived to direct workers into essential industries.

In his first speech as minister of labor, Sir Walter Monckton said there were 400,000 vacancies in industry and it was unlikely that there would be any easing of the shortage for several years. Of these vacancies, 110,000 are in the metal manufacturing, engineering, vehicle and aircraft industries.

Early in the new year the British government will introduce legislation to de-nationalize the steel industry. Thus, the process which took place last February when the state acquired 92 companies will be reversed. If the bill goes through, there will probably be as little dislocation as was the case last year.

WEST GERMANY IS rapidly working back into the brotherhood of Europe—by means of greatly increased production and a little sharp horsetrading. Two big scores in 1951: Steel ingot capacity almost up to the prewar levels and a good measure of political autonomy.

The biggest German problems in 1952 will be financing capital investments, maintaining coal supplies.

Signs of Recovery—West German steel ingot capacity reached an annual rate of 14.9 million tons in 1951. This significant recovery was to a large extent based on coal imports from the United States, which amounted to 1.98 million tons in the third quarter and will probably reach 2.42 million tons in the fourth quarter, 1951.

Other basic industry production increases are charted below.

In Millions of Tons

	Coal	Pig Iron	Steel	Rolling Mill Products
1949 ...	113	7.8	9.9	6.9
1950 ...	121	10.3	13.3	9.2
1951 ...	132	11.8	14.9	10.2

Orders for All—The steel industry will start the new year with order backlogs of 8.8 million tons of rolled steel. The plants are sold out for about one year. Steel processing industries have similar backlogs, mainly machinery and shipbuilding plants. The latter are sold out to the end of 1954. German machine tool manufacturers have backlogs up to 18 months.

Production of nearly all types of steel show considerable increases in 1951 over 1950, the exceptions being rails, ties, etc., and structurals. Steel bars went from 2,448,600 tons in 1950 to 2,889,700 tons in 1951; wire rods from 988,900 tons in 1950 to 1,079,100 in 1951; heavy plates from 948,200 tons in 1950 to 1,223,200 tons in 1951; and tubes and pipes from 611,600 tons in 1950 to 702,900 tons in 1951.

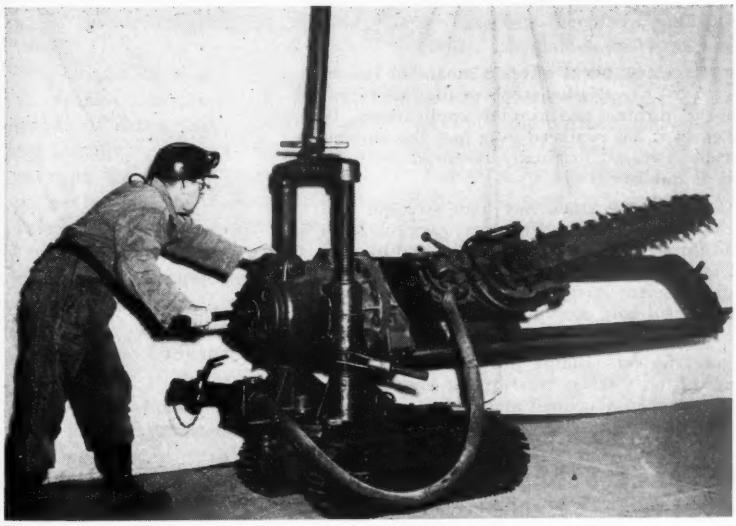
Shipped to the U. S.—Shipped to the United States during the first nine months of 1951 were 73,370 tons of tubes and 12,430 tons of wire nails. About one-half of current tube production is being exported, to the benefit of the German tube makers, who are getting exorbitant export prices.

German coal mine managers are doing everything within their power to step up coal production. The trade unions are thoroughly behind the effort as means of beating the drum for their co-determination policy. A slight reduction in German coal export quotas, from 6.8 to 6.5 million tons for each quarter starting January, 1952, will ease the coal situation somewhat.

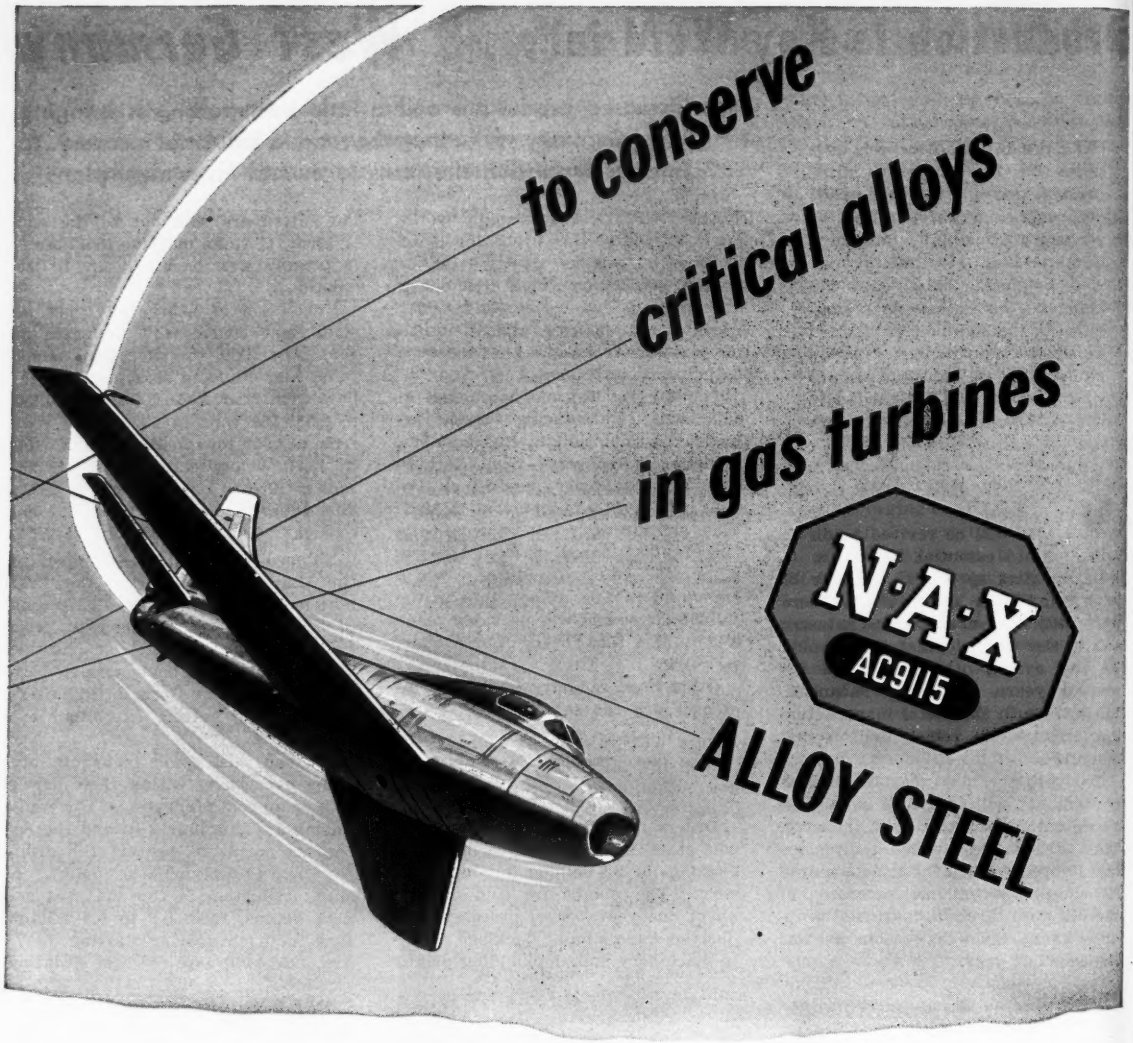
No more rolled steel will be swapped for U. S. coal after January, 1952, however. This results from growing pressure in favor of keeping steel within Germany and of permitting its export only in highly processed form.

Where's the Wherewithall?—Probably the biggest German problem for 1952 is getting capital to finance expansions and modernizations of her heavy industries. As yet, the Germans have no free market in heavy industry. A large amount of capital is expected from public funds, because a functioning private capital is just beginning to revive. Up to now the best source of capital has been the very favorable export value of German goods.

The German coal mines administration is working on a plan establishing a Mutual Investment Trust to induce miners and the general public to put their savings into stocks. American experiences with mutuals will be used to spread the idea of "peoples capitalism."



PARTIAL ANSWER: Part of the answer to Germany's need for more coal is this Korfmann coal cutter. Weighing approximately 1½ tons, the new machines use compressed air instead of electricity for power. As a safety feature, the machine is designed so that the operator need not work within eight feet of the face



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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Congressional investigators change their tune when they come to Detroit and see under what conditions civilian suppliers for the military operate

DETROIT

IF THEY learned nothing else while in Detroit the members of the subcommittee on government operations of the House Committee on Expenditures learned that there is more to supplying the army than simply manufacturing the parts.

Week-long hearings by what is commonly called the Hardy Committee after its chairman, Rep. Porter Hardy Jr., gave the congressmen and many of the observers from other government agencies an insight into the ramifications of doing business with the government. A few even went so far as to admit that some of their assumptions had been wrong, and one said that maybe some good comes from the "five percenters."

Changed Tune—Leaving Detroit for Washington where the committee will prepare its report, Chairman Hardy went so far as to say: "I am not sure whether I am in favor of changing the present method of buying spare parts for army vehicles or not. The industry people certainly showed that some of our assumptions were in error."

This admission goes a long way to remove the suspicion in the minds of many people that industry is guilty of gouging the government in its sale of parts for ordnance vehicles. The last time the subcommittee held hearings in Detroit some extremely nasty business was uncovered relative to irregularities on the part of ordnance personnel. A shake-up in command of the Ordnance Tank Automotive Center, and removal from office and demotion for several key figures resulted. The latest hearings began with at least as spectacular overtones.

Advance Thinking—The committee came to Detroit armed with case histories aimed at proving that the Army had been overcharged $305 million over the last three years in its buying of vehicles parts. Under fire were many of the auto and truck makers and such suppliers as Electric Auto-Lite and Timken-Detroit Axle Co. Parts makers were accused of failure to bid on items made for military vehicles, companies were accused of collusion in making bids, and virtually all were suspected of outrageously high profit margins on their military business.

Auto, Truck Output
U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,847
October	548,350*	796,010
November	480,323*	833,784
December		671,622

Week Ended	1951	1950
Nov. 24	80,489	122,716
Dec. 1	119,962	152,107
Dec. 8	116,932	162,757
Dec. 15	117,491	172,307
Dec. 22	100,000*	160,912

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Industry, by and large, did a superb job of acquitting itself of the worst of these charges—the last one. It surprised the committee, however, by its logical explanations of the first. On the "collusion" charge it achieved, for the moment at least, a stand-off.

No Bid—The committee's main bone of contention was over the disinclination of automotive parts manufacturers to bid. Their failure to do so, in the committee's estimation, caused pyramiding of profits as these parts went through the hands of middlemen before the ultimate one finally replied to a government invitation to bid. Edward P. Schaffer, an investigator for the subcommittee, led the attack against practices which OTAC officials conceded might have added to the cost of particular items. Brig. Gen. Carroll H. Dietrick, commanding general of the center, rebutted the committee's $305 million estimate of the cost of center's way of accepting bids from other than the original manufacturers. He admitted, however, that bidding by other than the manufacturers might have added about $177 million. He justified the extra cost on the basis of being sure of getting the parts when needed. He testified that he had conferred with officials of many of the vehicle and parts manufacturers in August in an attempt to convince them to change their selling practice, but got the almost universal answer that they were not willing to make any change. He said, however, that in fiscal 1951 about 70 per cent of contracts awarded by the center went to manufacturers rather than distributors.

When General Deitrick told the committee of the industry's disinterest in selling parts directly to the military, a good clue to the bureaucratic turn of mind was provided in this question by a committeeman: "Why can't the government force these people to cooperate in the war effort."—Especially since they "are at our mercy."

In the Middle—The middleman role—performed in some cases by auto makers, in some instances by their replacement parts distributing organization, and sometimes by the five-percenters — between the parts manufacturers and the military consumers was ably defended. F. W. Misch, assistant comptroller of Chrysler Corp., which was cited by Investigator Schaffer for its "price-pyramiding" activities, said that Chrysler had saved the government money by performing services which the government could not

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economically perform for itself. "Chrysler's net income from its parts business with the government has been nominal," he testified, and cited its record after World War II's renegotiation when it was found not required to return any money for overcharging. He found fault with the committee's figures on cost of packaging military items. Instead of 10 per cent of the cost of the item, which the committee used as an average figure, he said actual packaging cost averages 23 per cent, and in one instance where the part cost a third of a cent the cost of packaging to government specifications was three cents.

Similar Story — Much the same story was told by Myrle E. St. Aubin, director of service section, General Motors Corp. He was replying to the charges of Mr. Schaffer that by selling parts only through its distributing division, United Motors Service, instead of a 5.7 per cent profit GM was realizing a 35.9 per cent profit. UMS, operating 20 warehouses and carrying an inventory of $25 million worth of parts, is the warehousing, distributing, sales and service organization for 13 accessories manufacturing divisions of General Motors.

When asked to bid on ordnance parts, Mr. St. Aubin stated, UMS enters its bid "equal to or lower than the most favorable price that it quotes on that item to any other customer." If more than normal commercial packaging is required it adds the cost of the special packaging.

Finances — UMS' business with the government during the first ten months of 1951, Mr. St. Aubin related, amounted to $7,707,000. The price it paid the manufacturing divisions for these parts was $7,175,000 for a gross profit of $532,000 or 6.9 per cent of sales. Deducting from the gross profit only the normal overhead of UMS, these sales resulted in net loss by UMS of $186,000 or 2.4 per cent. He makes it very clear, however, that this is not necessarily a loss for the corporation. GM, he says, "presumably obtained a reasonable profit since the cost to United Motors Service charged by the manufacturing division. included a manufacturing profit."

Crystal Ball on Autos

Guarded optimism about next year's automobile production is expressed by a group which keeps close tabs on what the industry itself is thinking. Feature of an annual luncheon given by the Automobile Manufacturers Association for automotive writers in Detroit is the trotting out of the proverbial crystal ball.

The writers as a whole last year came to the mistaken conclusion that military demands on materials and production facilities would necessitate extremely drastic curtailments in automobile production.

The consensus was that only 3,395,000 passenger cars and 908,000 trucks and buses would be turned out by United States plants for a total of 4,303,000 units. They are going to miss by almost 2.5 million vehicles. This year will see produced 5,340,000 cars and 1,425,000 trucks and buses or 6,765,000 units in all, according to AMA's preliminary estimate.

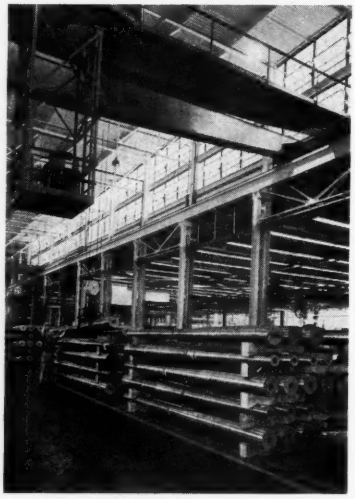
For 1952 the "experts" are guessing passenger car production will be someplace between 2,850,000 and 4,988,000 and that truck and bus output will lie between 756,000 and 1,750,000. Their composite figure is 3,932,000 cars and 1,290,000 trucks and buses—a total of 5,222,000 vehicles, including military.

Industry men have been coy, not to say completely inarticulate, in making predictions for 1952 production. It's a fruitless pastime since the usually reliable indicators bearing on supply and demand are not functioning freely.

There is a prevalent feeling, however, that for about six months cars will be in adequate supply. Hugh J. Ferry, president of Packard, has stated that by mid-year "signs point toward a mild sellers' market appearing which will make its effects progressively felt to the point where a car shortage seems probable." He emphasizes that the last six months will be critical from a civilian goods standpoint. Copper, he predicts, will remain the No. 1 troublemaker, followed by aluminum and steel in that order.

Ivan L. Wiles, Buick general manager, brings home the realities of next quarter's production outlook by stating that Buick will build about 74,469 cars—only 61 per cent of its first quarter 1951 output. In 1951 Buick will have built 404,657 cars, compared to 552,827 last year.

Despite production curtailments most car makes are plentiful. Inventory liquidation of 1951 models is proving to be somewhat of a problem particularly where the 1952 offerings are changed significantly. Threat of a car shortage next year sounds hollow to people who can see storage areas of unsold new cars around Detroit.



NO BEAN-SHOOTERS: Partially machined tubes for 90 mm tank cannon make this pattern at Oldsmobile's gun plant, Lansing, Mich. The GM division has been able to "tool around" some of the missing equipment at this plant to accelerate production of finished guns

Aero Willys Price Near $2000

After pulling a faux pas by publishing factory wholesale prices for the yet-to-be-introduced Aero Willys, OPS has now set what it terms "basic" ceiling prices on these passenger cars. "Basic" to OPS means the manufacturer's price to dealers, F.O.B. Toledo, plus the "customary established mark-up." The new cars are price-tagged at $1718.25 for the Deluxe "L" head model, $1915.25 for the super deluxe "F" head model, and $1984.20 for the custom "F" head model. By the time transportation, handling charges and taxes are added the car cannot be described as low priced.

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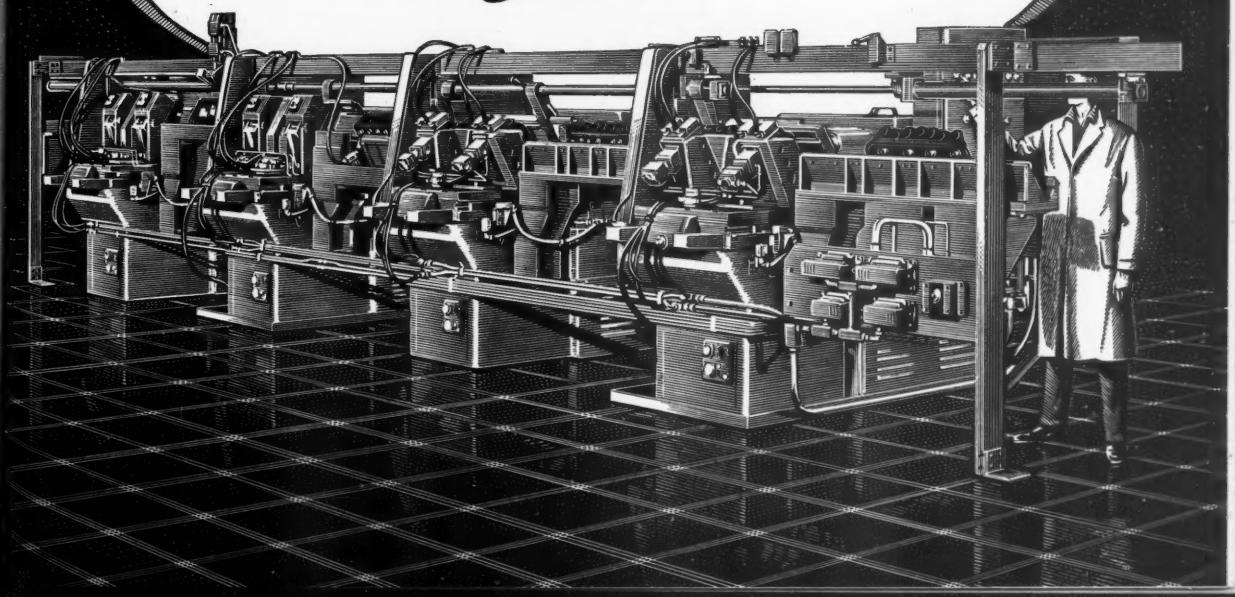

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SHARONSTEEL

The Business Trend

Industrial output in December will remain close to the November level as holidays, cold weather and production limitations cut into operations

LITTLE CHANGE is likely in the level of total industrial production for the next few months. Any variation from the fall pattern would be further increase in hard goods manufacture at the expense of soft goods. That's because most civilian lines are dragging and the arms program hasn't taken up the slack as was expected.

Nondurables production in November fell to the lowest mark since July, says the President's Council of Economic Advisors. Its preliminary estimate of the Federal Reserve Board's industrial production index placed the nation's output at 218 per cent of the 1935-1939 average, down one point from the September and October mark. Durable goods output, under impact of defense needs, continued its slow advance, while textiles, and crude oil output suffered in the month.

December won't be far off the November pace as holidays, cold weather and production limitations cut into operations. STEEL's weekly industrial production index shows the December average thus far to be slightly higher than November's, but the holiday period and long weekends away from the job must be reckoned with. In the week ended Dec. 15, STEEL's index (1936-1939=100) was set at 217, up three points from the previous week. One month ago the index registered 213; a year ago it was 218, the month's high.

Outdoing Itself. . .

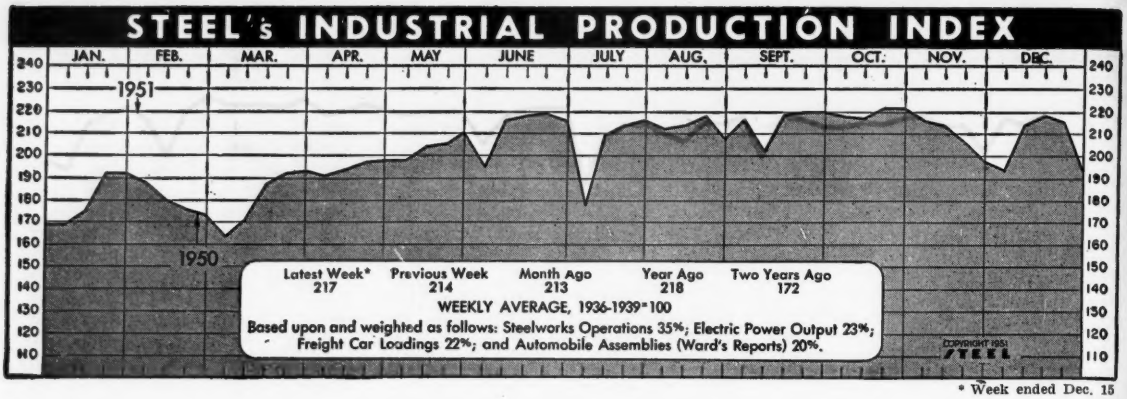
Another new record was scheduled to be racked up by the nation's steel mills in the week ended Dec. 22, according to American Iron & Steel Institute calculations. In the fifteenth consecutive week of over-capacity operations, producers were expected to turn out 2,097,000 tons of ingots and steel for castings, 16,000 more than output the week before and 8000 tons more than the previous record week ended Oct. 29. One year ago turnout was 1,944,000 tons. Latest week's figure surely will not be surpassed this week because of the holiday. If a steel strike hits the industry next week, last week's output will be the highest for some time.

Lower Business Volume. . .

Business conditions are now on a high level from the standpoint of volume and profit but show a definite trend towards a gradual reduction of both. That's what Purchasing Agents Association of Chicago found in its November survey of members, and buyers' attitudes are generally good indicators of near-term business. Members surveyed in November reported backlogs of orders continue downward and that deliveries are faster. Inventories are gradually being worked lower. Slow trend toward reduction of employees continues. These four factors, says the business survey committee, point definitely to a lower business volume. In answer to a special question on whether they believe there is a steel shortage, members' opinion was divided, 56 per cent saying "yes" and 44 per cent saying "no." Of those believing there is a steel shortage, 85 per cent

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	104.0	103.5	101.0	101.5
	Electric Power Distributed (million kilowatt hours)	7,667	7,444	7,333	6,985
	Bituminous Coal Production (daily av.—1000 tons)	1,867	2,029	1,900	1,919
	Petroleum Production (daily av.—1000 bbl)	6,175	6,221	6,237	5,723
	Construction Volume (ENR—Unit $1,000,000)	$192.6	$324.1	$312.9	$136.5
	Automobile and Truck Output (Ward's—number units)	117,491	116,932	120,767	172,350
	* Dates on request. † Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	780†	774	814	773
	Business Failures (Dun & Bradstreet, number)	143	136	109	150
	Currency in Circulation (in millions of dollars)‡	$29,037	$28,891	$28,601	$27,759
	Department Store Sales (changes from like wk a yr. ago)‡	−1%	+4%	+7%	+2%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$16,496	$17,473	$13,801	$16,035
	Federal Gross Debt (billions)	$259.4	$259.5	$257.9	$256.9
	Bond Volume, NYSE (millions)	$14.0	$16.4	$9.5	$25.0
	Stocks Sales, NYSE (thousands of shares)	7,144	8,244	5,122	13,856
	Loans and Investments (billions)†	$73.1	$73.3	$72.3	$69.8
	United States Gov't. Obligations Held (millions)†	$31,856	$32,082	$31,596	$32,924
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	167.67
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	234.9	243.0
	All Commodities†	177.2	177.1	177.2	174.7
	Metals and Metal Products†	190.9	190.9	190.9	185.9
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 217
Previous Week 214
Month Ago 213
Year Ago 218
Two Years Ago 172
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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* Week ended Dec. 15

think it will be relieved in the second or third quarter.

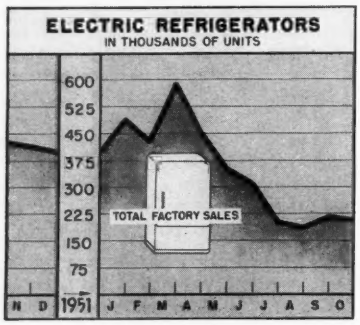
100 Million Mark Passed. . .

December saw the 100-millionth passenger car built in the United States roll from the assembly lines. An Automobile Manufacturers Association tabulation shows the first million cars were completed by 1912. The 25 millionth car was assembled in 1925, the 50 millionth in 1935 and the 75 millionth in 1946.

Slumps in output for the rest of the year are in store for the auto industry. Most builders will be closed today; some even decided to end last week's operations on Thursday. Independents will operate at high levels though. They haven't bumped the government unit-production ceiling yet. *Ward's Automotive Reports* says that the independent passenger car makers will end 1951 with the same share of industry output—about 13 per cent—as in 1950. Truck output in 1951 has already passed 1948's mark and each unit now produced sets a new record. Independents this year will produce 26 per cent of the industry total, in contrast to the 20 per cent accounted for in 1950 and 30 per cent in 1948. U. S. and Canadian assembly lines held steady in the week ended Dec. 15; *Ward's* says car-truck output was 117,491, compared with 116,932 in the previous week. New passenger car registrations in October totaled 580,373, making 5,329,986 for ten months.

Structurals Hit Tonnage Peak . . .

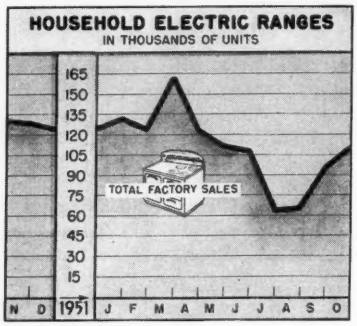
New tonnage peak is being established for shipments of fabricated structural steel in 1951—greater even than during the peak of World War II or the postwar period— says American Institute of Steel Construction. Statistics for 1951 show a record-breaking 2.7 million tons of fabricated structural steel shipped during the year when defense and civilian re-



Electric Refrigerators
Total Factory Sales—Units

	1951	1950	1949
Jan.	488,607	375,856	396,329
Feb.	423,420	461,256	348,539
Mar.	591,449	586,293	382,861
Apr.	445,636	546,279	335,092
May	348,423	542,865	341,933
June	309,125	549,740	310,780
July	199,616	507,029	327,429
Aug.	187,603	518,359	314,839
Sept.	215,459	535,002	326,149
Oct.	209,263	420,431	265,575
Nov.	.....	411,201	230,258
Dec.	.....	394,268	272,636
Total	.....	5,848,579	3,852,420

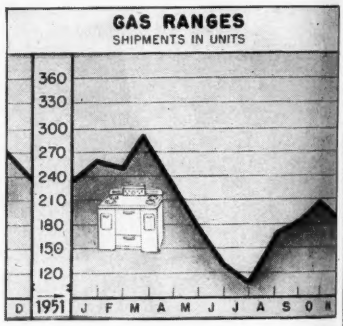
National Electrical Mfrs. Assoc.



Household Electric Ranges
Total Factory Sales—Units

	1951	1950	1949
Jan.	132,437	97,925	109,919
Feb.	123,953	118,989	88,333
Mar.	162,267	145,417	88,934
Apr.	122,803	132,859	60,739
May	109,572	145,498	52,881
June	107,861	158,534	69,107
July	62,713	130,505	63,249
Aug.	64,874	132,243	66,753
Sept.	96,182	156,216	93,045
Oct.	110,203	130,452	73,312
Nov.	.....	129,384	60,523
Dec.	.....	124,360	77,011
Total	.....	1,602,382	903,806

National Electrical Mfrs. Assoc.



Gas Ranges
Shipments in Units

	1951	1950	1949
Jan.	260,600	165,000	106,700
Feb.	254,000	209,000	117,700
Mar.	289,800	264,000	151,500
Apr.	225,000	239,100	150,100
May	177,800	242,800	151,600
June	128,500	217,000	162,200
July	116,400	254,800	125,800
Aug.	168,100	331,500	206,100
Sept.	183,600	287,000	227,300
Oct.	206,800	308,000	257,500
Nov.	188,400	269,100	237,400
Dec.	.....	235,900	175,700
Total	.....	3,023,200	2,069,600

Gas Appliance Mfrs. Assoc.

Charts—Copyright 1951 STEEL

quirements raised demand to an all-time high. Outlook is for an even better year in 1952, says R. D. Wood, president of the institute. If there is no interruption to supply of steel such as might be caused by a prolonged strike or severe shortage of scrap, fabricators will turn out greater tonnage than this year. "Because steel operations are organized to produce a balanced mix of finished products, record production of steel next year will also mean record rolling of structurals and plates", says Mr. Wood.

Housing Slumps 12 Per Cent . . .

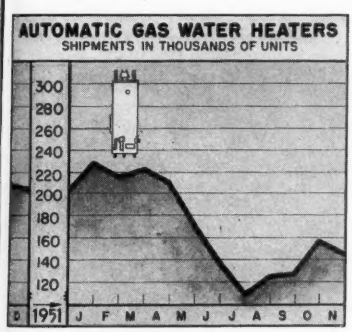
November housing starts dropped 10,000 units from October to 76,000, says Bureau of Labor Statistics. With the November total, homebuilding officially passed the 1 millionth permanent nonfarm dwelling mark. The 12 per cent dip in November starts was seasonal, says the agency, but particularly sharp declines were noted in the Midwest and mountain states, probably because of severe weather in those sections. The 11-month cumulative housing total now registers 1,022,600 units, compared with 1,302,600 for the same months in 1950.

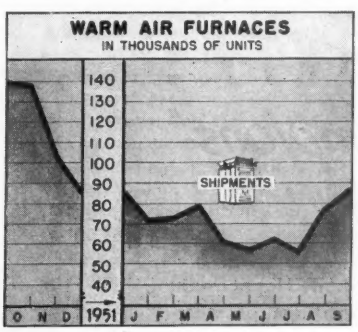
Trends Fore and Aft . . .

Gas appliance production took another downturn in November (see charts) . . . U. S. foreign trade balance in October: Imports, $832.4 million, exports $1154.3 million . . . Japanese and Italian competition is hurting domestic sewing machine makers . . . Christmas store sales this year won't match last year's volume . . . Wholesale prices are about 13 per cent above the pre-Korean average, but the rise in the year has been only 1.5 per cent. Consumers' price index continues its rise though. . . the Commerce Department has released its 1950 annual survey of manufactures . . . Shipments of all ferrous castings skidded in September . . . but steel forgings shipments rose 14 per cent . . . Electric power output in the week ended Dec. 15, registered a whopping 7,666,864,000 kwh. . . Business failures have been under year ago levels for the last month.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Dec.10	Gear Sales Dec.17	Purchasing Power...Oct.8
Durable Goods Oct.8	Gray Iron Castings.Nov.26	Radio, TV Dec.10
Employ., Metalwkg.Nov.12	Indus. Production ..Nov.19	Steel Castings Dec.3
Employ., Steel Dec.10	Ironers Dec.17	Steel Forgings Nov.26
Fab. Struc. Steel...Nov.12	Machine Tools Dec.3	Steel Shipments ...Dec.17
Foundry Equip. Dec.17	Malleable Castings.Nov.26	Vacuum Cleaners ..Dec.3
Freight Cars Nov.19	Prices Nov.19	Wages, Metalwkg. ..Oct.22
Furnaces, Indus. ..Dec.10	Pumps Dec.10	Washers Dec.17





Automatic Gas Water Heaters
Shipments in Units

	1951	1950	1949
Jan.	225,600	131,600	88,400
Feb.	213,400	156,500	84,500
Mar.	223,300	172,800	106,000
Apr.	199,400	176,400	115,200
May	167,400	195,200	120,200
June	131,500	207,100	132,200
July	102,400	197,500	114,400
Aug.	124,400	259,800	138,800
Sept.	130,900	222,600	147,300
Oct.	157,700	235,100	154,200
Nov.	145,300	206,000	138,300
Dec.	.....	202,500	126,500
Total ...	.....	2,363,100	1,466,000

Gas Appliance Mfrs Assoc.

Warm Air Furnaces
Shipments in Units

	1951	1950	1949
Jan.	71,143	39,887	31,734
Feb.	71,966	45,618	33,011
Mar.	79,239	59,982	51,271
Apr.	60,337	58,798	34,471
May	56,282	78,349	42,406
June	61,889	98,517	55,916
July	55,045	102,189	48,575
Aug.	77,192	145,512	85,320
Sept.	87,412	139,014	112,264
Oct.	.....	137,915	103,401
Nov.	.....	102,001	79,280
Dec.	.....	85,407	52,323
Total	.....	1,093,189	719,972

U. S. Bureau of the Census

Yes, Pheoll "COLD-HEADING" AND ROLL THREADING PROCESSES MAKE BETTER PARTS . . .

Stronger, Faster, Cheaper

Countless small parts usually made by conventional turning processes — by stamping, drawing, casting or molding — can be made *better . . . stronger . . . cheaper* by *cold-heading* and roll threading.

Machining of Cold-Headed Parts is hardly ever necessary because shank and head dimensions can be held to very close tolerances. Rolled threads are produced to American Standard dimensions.

Here are just a few of the many parts formed or roll threaded . . .

Screws	Plastic Inserts	Stems
Bolts	Thumb Screws	Arms
Studs	Wing Nuts	Plugs
Rivets	Small Gears	Prongs
Rods	Tongue—Clevis	Points
Links	Segments	Hooks

Single or multiple secondary operations can be performed on cold-headed parts to produce special characteristics required to fit the part for its particular application. These secondary operations include drilling, tapping, milling, shaving, flattening, notching, flanging, trimming, serrating, bending, off-setting, slotting, fluting, swaging, knurling, pointing, heat treating, plating and finishing.

ARE YOU MISSING THIS SAVING?

Write or call in a Pheoll engineer. Explain your production problems. He will tell you where you can save money, speed production, improve your product appearance.

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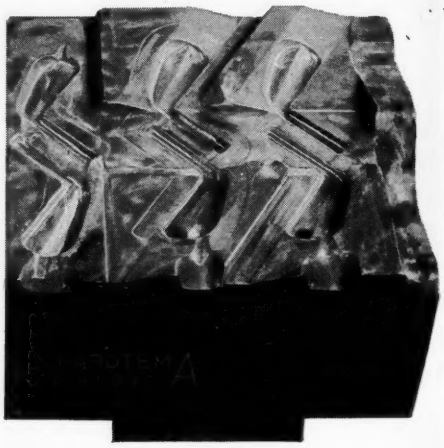
Industrial Fasteners and Holding Devices

It's performance that counts

THE CHAMPION		AVERAGE PRO
He wins when the pressure's on		He looses the tough matches
5'11"—	HEIGHT	—5'11"
29 yrs.—	AGE	—29 yrs.
165 lbs.—	WEIGHT	—165 lbs.
39"—	CHEST	—39"
7"—	WRIST	—7"
32"—	WAIST	—32"

. . . there's more to a "Champion" than the tape measure shows!

HARDTEM DIE BLOCKS . . . *perform like "champions" in the production line*



Because they're carefully forged and heat treated by Heppenstall, Hardtem Die Blocks possess exceptional qualities of wear-resistance. Their patented steel analysis resists softening and heat checking in service. Proven in service many times over, the record of Hardtem Die Blocks assures the following benefits for production:

- **LONG LIFE OF DIES**
- **HOLDS TRUE DIMENSIONS**
- **LESS DOWN TIME**
- **LONGER PRODUCTION RUNS**
- **LOWER OVERALL DIE COST**

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Send all obsolete equipment to your local scrap dealer AT ONCE

Heppenstall

. . . the most dependable name in die blocks, piston rods . . . hammer rams . . . sow blocks

Men of Industry

Charles R. Martin and **Henry F. Banzhaf** were appointed to new posts at **Allis-Chalmers Mfg. Co.'s** Hawley Works, Milwaukee. Mr. Martin, assistant chief inspector of the general machinery division for the last three years, was named in charge of manufacturing, production planning and production control at the works. Mr. Banzhaf, named assistant to manager, Hawley Works, has been special assistant to the manager of the control section.

Frank W. Smith retired as vice president in charge of Norton Co.'s grinding machine division, Worcester, Mass. He will remain with the company as a consultant responsible for construction of its new machine division expansion, but relinquishes responsibility for operation of the division to **Ralph F. Gow,** executive vice president. Mr. Smith has been with Norton Co. 33 years.

Roy J. Heinz was elected vice president of **Pittsburgh Steel Foundry Corp.** in charge of operations at its Glassport, Pa., foundry. He has been general foundry superintendent at Glassport for the last six years. Before association with Pittsburgh Steel Foundry, Mr. Heinz was with Union Steel Castings Co.

William T. Powell was elected executive vice president, **Emsco Derrick & Equipment Co.,** Los Angeles, a newly created position. He has been vice president for the last nine years.

J. B. Ford Jr. was elected to the board of directors of **Detroit Steel Products Co.,** Detroit. His election fills a vacancy on the board.

Columbia Machine Works, specializing in heavy machining for marine and industrial purposes, with plants in San Francisco and Berkeley, Calif., named **William A. Cannon** as general manager.

Recent elections at **Universal Atlas Cement Co.,** New York, subsidiary of U. S. Steel Corp., include: **George H. Reiter,** vice-president-general sales manager, named to the newly created office of executive vice president; **Fred T. Wiggins,** vice president-assistant general sales manager, elected vice president-general sales manager; **Charles B. Baker,** assistant to president and secretary, elected vice president—general attorney; and **D. C. Leo,** elected secretary.

LYMAN D. WARNER
. . . a V. P. of American District Steam Co.

WALTER G. ENGLER
. . . Gifford-Wood general sales mgr.

Lyman D. Warner was appointed vice president in charge of market and product development and promotion for **American District Steam Co. Inc.,** North Tonawanda, N. Y. He continues in charge of all sales activities relating to defense production.

Pennsylvania Salt Mfg. Co., Philadelphia, in completion of a new organization of its sales division, named **Russell S. Roeller** as general sales manager. He previously was assistant general sales manager, a position now eliminated. Reporting to him are **Albert H. Clem** as field sales manager, **Edwin S. Garverich** as manager of technical service, and eight department sales managers. The planning organization for the sales division is headed by **Arthur G. Tunstall Jr.** as manager of marketing. Reporting to him are **Paul C. Hurley,** manager of sales promotion; **Franklin A. Lucard,** heading the new department of sales development; and **Malcolm J. Harkins** in the position of manager of sales control.

J. Henry Anthony, manager, industrial engineering division, **Whitney Chain Co.,** Hartford Conn. was appointed plant superintendent in addition to his existing duties. He has been with Whitney Chain in various factory production capacities for the last 12 years. Prior to joining the company in 1940 he had charge of the manufacturing division of Manning, Maxwell & Moore.

Melvin J. Henry was appointed general sales manager, **United Lacquer Mfg Corp.,** Linden, N. J. He formerly was with R. H. Macy & Co. for 22 years.

Walter G. Engler, a sales engineer of **Gifford-Wood Co.,** Hudson, N. Y., for nearly 25 years, was appointed general sales manager of this materials handling equipment manufacturing firm. The position has been vacant since the death of **William E. Herb.**

Barber-Green Co., Aurora, Ill., appointed **E. H. Holt** general sales manager, and **J. D. Turner** as director of publicity and promotion. **W. B. Holder,** formerly general sales manager, heads up a new division of the company, plans for which are being formulated.

Terre Haute Malleable & Mfg. Corp., Terre Haute, Ind., elected as treasurer **Ashley C. Sinnett.** He formerly was treasurer of Benton Harbor Malleable Industries Inc., and was previously associated with Malleable Founders' Society and Texas Foundries Inc.

Carson L. Ruyle was appointed advertising manager of **Gardner-Denver Co.,** Quincy, Ill. He joined the company in 1930, serving in various capacities in the engineering and accounting departments. After a brief absence from the company, he rejoined it in 1941.

G. B. Davis was elected vice president in charge of sales, **Baker-Raulang Co.,** Cleveland. He succeeds **John R. Morrill.** Mr. Davis joined the company in the purchasing department in 1935 and was transferred to sales in 1937. He was named assistant sales manager in 1945, promoted to sales manager in 1948 which office he has held until the present time.

Russell H. Coe was appointed to rep-

resent **Tapecoat Co.**, Evanston, Ill., on its coal tar tape for pipe joint protection in Ohio, West Virginia and western Pennsylvania. He formerly was with Pittsburgh Coke & Chemical Co.

With building construction for manufacture of jet aero engines scheduled to start in 1952, **Rolls Royce Ltd.** announces appointments to key positions in its Canadian operation in Montreal. **Dr. Erle Warlow-Davies** was named general manager and chief engineer, and **David Boyd** was appointed production manager. **James H. Tivey**, previously general manager of the Canadian operation, remains as deputy general manager in charge of existing Rolls-Royce spares and field service organization before returning to the United Kingdom to take up a senior engineering appointment.

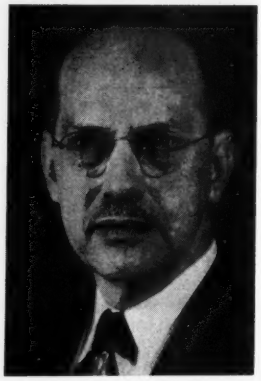
N. T. Joyner was appointed to a post on the technical staff of Votator Division, **Girdler Corp.**, Louisville, Since 1932 he has been with Lever Bros. Co., Cambridge, Mass.

Magnetic Metals Co., Camden, N. J., fabricator of magnetic core parts for communications and electronic equipment, appointed **Dr. A. W. Friend** as director of engineering and development. Formerly on the physics and communication engineering staffs of West Virginia and Harvard universities, Dr. Friend was also a staff member of M.I.T. Since 1944 he has been with the research department, R. C. A. Laboratories, Princeton, N. J. Most recently Dr. Friend has been developing radar gun fire control apparatus as director of engineering, instrument division, Daystrom Inc.

George C. Houston was appointed manager of manufacturing training in **General Electric Co.'s** manufacturing personnel development services department, Schenectady, N. Y.

J. T. Bell was promoted to Detroit district manager for **Mid-West Abrasive Co.**, Owosso, Mich. The Detroit district includes eastern Michigan and northwestern Ohio. He has been a sales representative for the company for the last seven years. **James J. Corcoran** will be responsible for the customer service division, and **G. Reogh Atkinson** and **D. F. McDonald** were added to the company's staff of service engineers. Mr. Atkinson, former general manager of Industrial Hone Co., will specialize in honing stones and abrasive specialties, while Mr. McDonald will devote his time to service engineering on coated abrasives.

ARTHUR W. HASENPFLUG
. . . V. P. of Artisan Metal Works



FRED A. MONTGOMERY
. . . chief engineer, Artisan Metal Works

Arthur W. Hasenpflug, formerly works manager and for the last year general manager of **Artisan Metal Works Co.**, Cleveland, was appointed vice president. **Fred A. Montgomery** was appointed chief engineer. He most recently was in charge of engineering at Bunell Machine & Tool Co. where he directed the building of special machinery and machine tools.

Laurence P. Saunders, formerly chief engineer, Harrison Radiator Division, General Motors Corp., joined **Bell Aircraft Corp.**, Buffalo, as a chief administrative engineer.

Raymond L. Carey, formerly tube mill engineer of Jones & Laughlin Steel Corp. at Aliquippa, Pa., is now associated with **Taylor-Wilson Mfg. Co.**, Pittsburgh, as assistant chief engineer.

Rockwell Mfg. Co., Pittsburgh, appointed five service managers following reorganization of its sales department. The eastern region will be directed by **M. J. Harper** with headquarters in New York. The central region will be supervised by **P. C. Kreuch** with headquarters in Pittsburgh. The southern region will be headed by **J. W. Northcutt** with offices in Atlanta. The midwestern region will be under jurisdiction of **C. K. Madison** with offices in Houston. The western region will be managed by **H. Boezinger** with offices in Los Angeles.

Norton Behr-Manning Overseas Inc. has formed a new sales-distributing company in Mexico City, known as Norton Behr-Manning S. A. de C. V. It will supervise sales and distribution of Norton Co., Behr-Manning Corp. and Norton Pike Co. products throughout Mexico. **Herbert A. Stanton** is president of the new sales company, with **Edgar A. Maschal**, formerly of Durex Abrasives Corp., vice president and general manager.

Boyd E. Cass was named manager of metallurgical sales for **Foote Mineral Co.**, Philadelphia. Before joining Foote in 1945, he was senior metallurgist for Baldwin Locomotive Works.

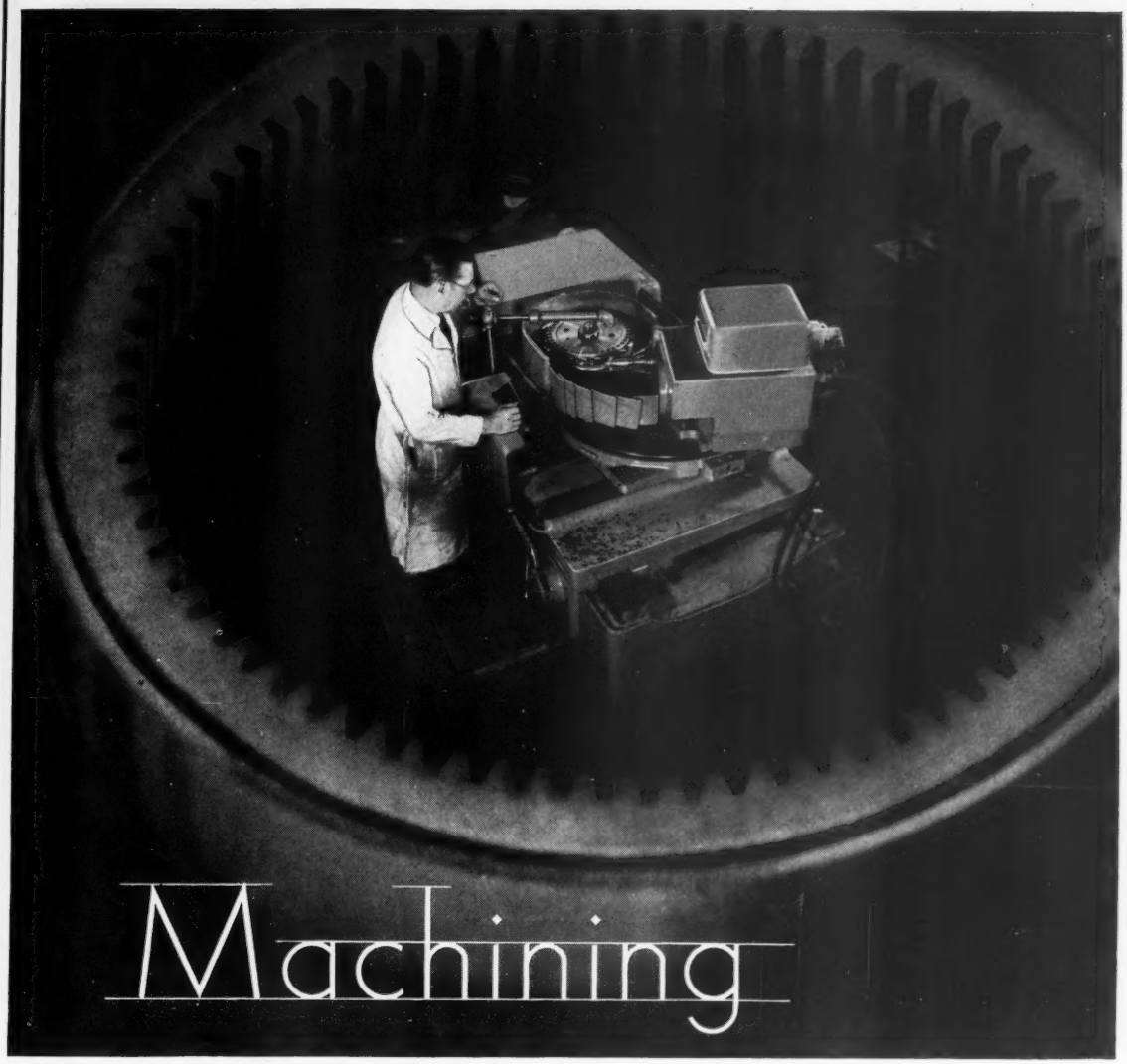
Horace J. Mellum retired as secretary of **Nash-Kelvinator Corp.**, Detroit. Mr. Mellum, who has been secretary of Nash-Kelvinator since its formation in January, 1937, and secretary of Nash Motors Co. from August, 1916, maintains his office at the company's Nash plant in Kenosha, Wis. **Godfrey Strelinger,** treasurer of the corporation since April, 1944, was elected secretary to succeed Mr. Mellum. Mr. Strelinger also continues as treasurer and as secretary and treasurer of several subsidiary companies.

Elwyn Mercer, industrial manager of the southwestern territory of **Allis-Chalmers Mfg. Co.**, Milwaukee, left recently for England to become general manager of the company's tractor division operations in that country.

Electro-Snap Division of Exhibit Supply Co., Chicago, manufacturer of precision limit switches and electrical devices, appointed **George W. Ledbetter** West Coast representative. He will make his headquarters at the Electro-Snap branch office at Sherman Oaks, Calif.

Feedrail Corp., New York, which manufacturers and markets trolley busway electric power distribution systems, appointed **Robert R. Gillen** as purchasing agent. He was formerly assistant purchasing agent for Russell & Stoll Co. Inc.

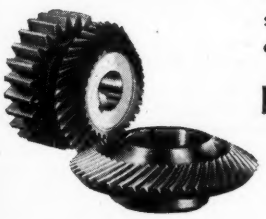
Harold A. Clough was named assist-



of gears is a matter of fitting competent men and efficient machines to the job. One machine may be used to make a variety of gears. But the quality of some types it produces might suffer... or the cost might be higher.

• Here at BRAD FOOTE . . . in our own plant . . . we have an assortment of gear-making machines each of which is used to make gears within certain specifications. This enables us to turn out a volume of gears while positively controlling quality and price. Our highly skilled workers subscribe to and uphold the BRAD FOOTE creed—*"No one shares our responsibility."*

• So when you specify BRAD FOOTE gears—for use in your shop or on the equipment you sell to others—you can be sure of satisfactory performance.



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Cicero 50, Illinois

ant sales manager of **Parker Aircraft Co.**, Los Angeles, subsidiary of Parker Appliance Co., Cleveland. He will be responsible for sales policy administration and customer relations and service with the aircraft tube fitting and valve production of Parker Aircraft's two plants.

Reeves Pulley Co., Columbus, Ind., manufacturer of variable speed control equipment, appointed **James A. Miller** as manager of its newly opened sales and engineering office in Los Angeles. Mr. Miller formerly was with Bryon-Jackson Co. Assisting Mr. Miller will be **Harlan M. Gillis** former engineer at Columbus.

S. T. Jazwinski, who resigned as senior staff engineer, metallurgical department, Ford Motor Co., joined Central Iron & Steel Co., Harrisburg, Pa., and its subsidiaries, Phoenix Iron & Steel Co. and Chester Iron Co. He will serve as chief metallurgist.

Star-Kimble Motor Division, Miehle Printing Press & Mfg. Co., opened new branch sales offices in Milwaukee and Cincinnati and placed in charge of the respective offices **Robert L. Palmer** and **Lloyd Steinmetz. Thomas R. Mahoney** was appointed a sales engineer to serve the northern New Jersey territory.

ROUTT A. BRYANT JR.
. . . division engineer

PAUL H. HILL
. . . Nesco V. P.-sales

Routt A. Bryant Jr. was appointed manager of plant engineering for **Consolidated Vultee Aircraft Corp.**, Convair Guided Missile Division, Pomona, Calif.

H. S. Cooper and **G. F. Groff** were appointed assistant controllers of **Crucible Steel Co. of America**, New York. Mr. Cooper has been auditor and Mr. Groff, manager of the tax department and assistant secretary.

William P. Schnabel, manager of the fine wire department of **Allegheny Ludlum Steel Corp.** at Dunkirk, N. Y., has retired after 33 years of service with the Dunkirk plant.

Paul H. Hill was elected vice president in charge of sales for **Nesco Inc.**, Chicago. For the last year he has been director of sales for the firm, and continues over-all direction of sales in the housewares, electrical, and stove and heater divisions of the company. Before joining Nesco Mr. Hill was vice president and general manager of Mengel Co., Louisville. **Chester H. Moore** was appointed chief engineer, housewares division.

Ampco Metal Inc. appointed **Nelson S. Cobleigh** as district manager of its Philadelphia sales division. Mr. Cobleigh formerly was a field engineer at Detroit.

OBITUARIES...

George W. Davies, 62, until recently general sales manager, **Sealed Power Corp.**, Muskegon, Mich., died Dec. 3. Mr. Davies was well known in the automotive industry, having been associated with Campbell, Wyant & Cannon Foundry Co. and Fitzjohn Coach Co. as an executive before becoming manager of Sealed Power's Detroit office in 1933. In 1941 he became sales manager of the Original Equipment Piston Ring Division and in 1948 was appointed general sales manager.

James M. Brown, 50, associated with **Surface Combustion Corp.**, Toledo, O., since 1927, died Dec. 3. He had been manager of the Cleveland district industrial sales office.

Oscar P. MacLean, 66, former Ontario sales manager of **General Steel Wares Ltd.**, died Dec. 8 in Toronto. He retired from the steel company two years ago.

Earl L. Brokenshire, 59, ore sales manager of **Oglebay, Norton & Co.**, Cleveland, died Dec. 16 in Columbus, O. He joined the company in 1909, and in the succeeding 42 years served in various capacities.

J. Phillips Cosgrove, 54, executive vice president, **American Radiator & Standard Sanitary Corp.**, Pittsburgh, died in New York Dec. 13 after a brief illness.

Earle L. Windenburg, a sales engineer for **Cutler-Hammer Inc.**, electrical appliance maker, Cleveland, died Dec. 15 of a heart attack.

Francis J. Donnelly, 51, treasurer, **Franklin Machine Co.**, East Providence, R. I., died Dec. 14.

C. S. Ackley, 78, secretary and a director of **McKiernan-Terry Corp.**, New York, and vice president and a director of Thermactor Co., construction machinery concerns, died Dec. 16.

Warren Rogers, 44, supervisor of benefit administration for **American Steel & Wire Co.**, Cleveland, U. S. Steel subsidiary, died of a heart attack Dec. 15.

Herbert B. Spigel, 38, general manager of the foreign import and export division of **Luria Bros. & Co. Inc.**, iron and steel scrap dealer, Philadelphia, died Dec. 11 after a two months' illness.

George J. Kaye, 57, sales representative of **Bethlehem Steel Co.'s** 56th street shipyard in Brooklyn, N. Y., died Dec. 10.

K. K. Hoagg, 62, U. S. and Canadian vehicle engineer for **General Motors Overseas Operations**, New York, died Dec. 11.

Alexander Marks, 59, general sales engineer of **Otis Elevator Co.**, New York, died Dec. 11.

Russell I. Baker, 59, manager of the Grasselli Works of **General Aniline & Film Corp.**, New York, died of a heart attack Dec. 11.

Darwin S. Luntz, 62, cofounder of **Luntz Iron & Steel Co.**, Canton, scrap metal company, died Dec. 11.

Robert H. Goacher, 43, treasurer, **Herring-Hall-Marvin Safe Co.**, Hamilton, Ont., died Dec. 10.

Fred Mahony, former president of **Mahony Mfg. Co.**, Troy, N. Y., died Sept. 8. The firm was engaged in iron fabrication.

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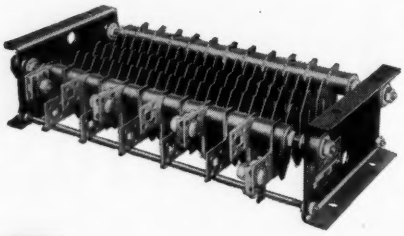
The welded grid assembly is shown here as a unit resting on narrow iron straps above its end frame, support rods, and spacers.

TAB • WELD

CONSTRUCTION does what clamping could not do

•

Stabilizes OHMIC VALUE independent of end clamping-nut pressure



▼

NO NUT TIGHTENING because burning does not occur

It's difficult to find "down-time" for servicing industrial equipment. Short lulls in production do not always permit time for a complete service job. Forgotten or unserviced items operate at lower efficiency—may eventually fail and require major repair or replacement.

When buying motor control resistors, do not overlook the low upkeep advantages of EC&M TAB-WELD Resistors. These plate resistors are off-set to bring grid-eyes into intimate contact and the tab-ends are welded. Tap-plates are also welded in place at convenient points. *No burning at grid-eyes or at tap-plates.* When replacing resistors or for new installations, specify EC&M Bulletin 942 TAB-WELD Plate Resistors.

LOWER UPKEEP saves the inital cost and more

THE ELECTRIC CONTROLLER & MFG. CO.

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CHRISTMAS NOTE—Borrowing fabricating methods from the appliance and automobile industries, a model toy manufacturer is mass-producing boy-sized road-building machines with man-sized equipment. Current production of about 220,000 units annually is based on progressive die operations. Most components are finished completely on one die. Forming machines in the plant consist of 15 presses ranging in capacity from 10 to 150 tons. p. 54

FROM THE LABORATORIES — One-tenth the thickness of human hair—that's the size of steel developed by Armco for use in a secret electronic device . . . A precision gage to determine wall thickness and concentricity of lengths of tubing consists of two horizontal arms with contact points wired to an electronic control box. Test specimen is slipped over lower arm of gage in operation. Fairchild Engine & Airplane worked out the details . . . Better methods for casting aircraft dies have been evolved by Armour Research Foundation. Shrinkage and warpage are more effectively controlled with improved techniques, including an application of flexible tubes to cool the metal dies.

NO MATERIAL PROBLEM—Seventy-five per cent of the total charge melted in one aircraft company's foundry consists of scrap generated elsewhere in the plant, mostly in bits of 18-8 and Inconel sheet from the cutting and trimming department. Monthly output is 44,000 pounds of high-temperature alloy castings. Inner and outer diffuser cores for turbojets, tailpipe flange rings, flanges and exhaust system selector valves are some of the parts produced. p. 58

TITANIUM IN TONS—Production of titanium metal at Du Pont's new Newport, Del., plant, is now 1½ tons per day, with 2½ tons expected in 1952. Estimated total production for the nation last year was 75 tons, of which Du Pont output was 55 tons. This year the company expects to turn out 400 tons. Plans are under way for expansion of capacity to 10 tons daily. In one of two special furnaces 15 tons of metal have already been melted; ingots up to 650 pounds are being cast.

WEIGHING JOB LIGHTENED—Electronic crane scales activated by Baldwin SR-4 strain gages simplify the weighing of massive parts and equipment at G-E's transformer and allied product department. The 300,000-pound capacity wire strain gage load cells are permanently installed in each of two crane hooks. A portable weight indicator and accessory reels of electric cord for connection to load cell units and electric power supply outlet are carried on a hand truck. The indicator has three scales: 0-50 tons, 50-100 tons, 100-150 tons. When two cells are used together to lift a load, each is read independently. Chief use of the crane weighing system is to determine weights of transformers both for shipping purposes and for engineering data.

SMALL BUSINESS AND DEFENSE—Manufacture of the 3.5-inch bazooka rocket is a good example of the effective defense job small businesses are turning out. Record of small companies is outstanding on three counts: Small companies are ingenious in solving manufacturing problems; their production costs on the average are lower; facilities are versatile and up-to-date. p. 64

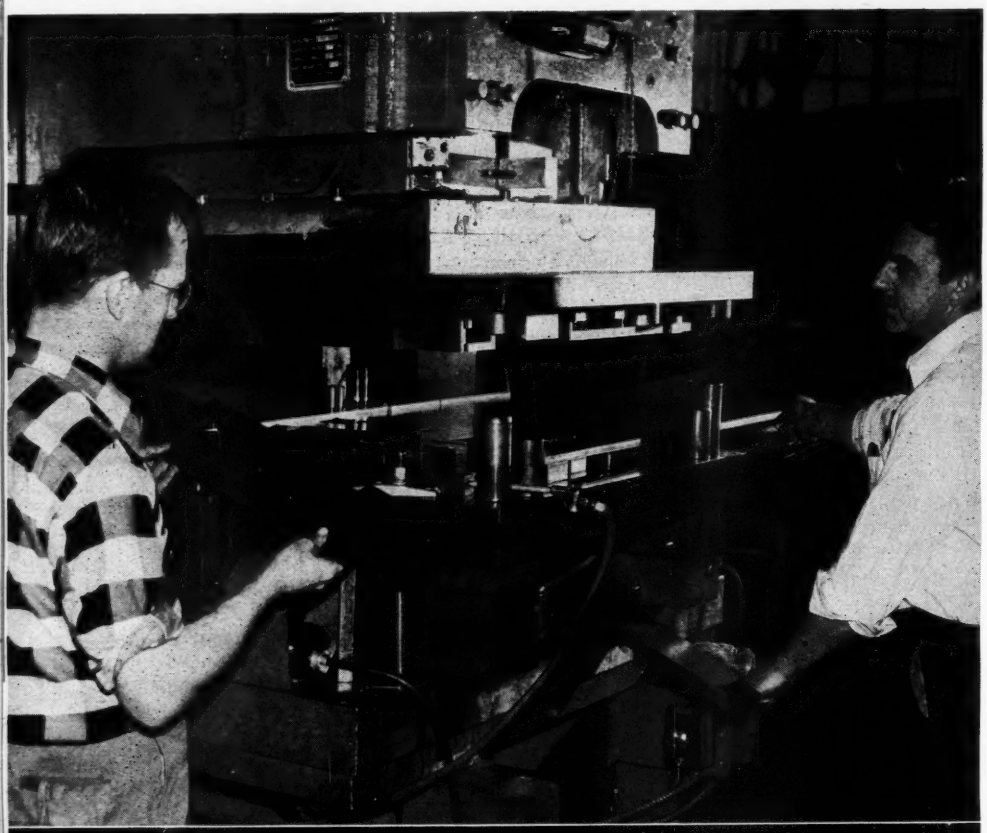
CUTS WITH GASOLINE—A cutting torch that burns gasoline and oxygen and brings an overall saving of 25 to 30 per cent to cutting, brazing, scarfing and similar operations—that's the brainchild of a Dartmouth College instructor, J. A. Browning. Browning says his torch can do as much work on 70 cents worth of gasoline as an oxyacetylene torch can do on a 100 cu-ft tank of acetylene. The cutting head is designed to eliminate backfiring and backflashing into the torch handle. The torch blends liquid gasoline and oxygen which is converted into vapor in the tip by heat of the flame.

MORE ON CONTINUOUS CASTING—"Highly satisfactory" describes a newly developed continuous casting machine which produces aluminum and brass rounds from ½ to 6 inches in diameter. The product ultimately will be used for screw machine products and for extruded and special shapes up to 4 inches in cross-section, as well as for forging stock.

TUNGSTEN MACHINES LIKE BRASS — Technique for drilling, grinding, turning, milling, threading and tapping tungsten using standard machines is being used on L-cathodes for electron tubes. The method permits machining of tungsten to tolerances comparable to those normally achieved with brass or steel. Tungsten tubing, for instance, has been fabricated with an outer diameter of 0.066-inch plus or minus 0.0005-inch and an inner diameter of 0.060-inch plus or minus 0.001-inch. An 0-80 tungsen screw 11/16-inch long has been made with a 0.025-inch hole drilled through its entire length. More applications are expected in electron tube manufacture and in the fabrication of other parts which must operate at high temperatures in a vacuum or in reducing or inert atmospheres.

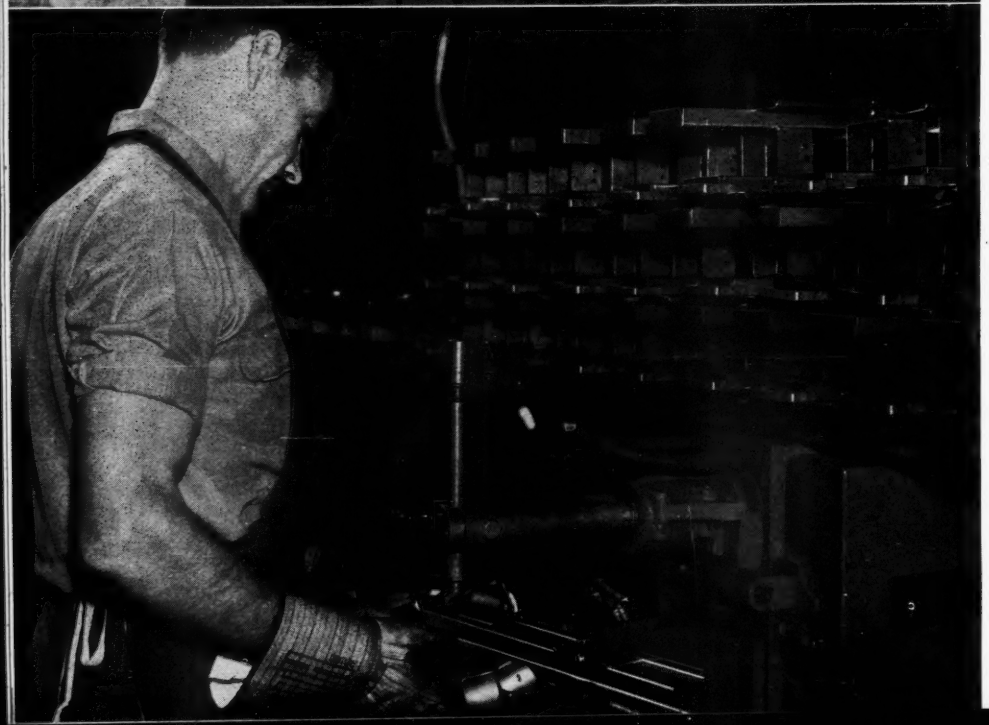
TOY PRODUCTION

...Bigtime Operation



This 150-ton Verson press equipped with a three-stage progressive die completes a fire truck chassis

High voltage electric welding machine fuses metal parts together on chassis of fire truck



Right — Model toys are thoroughly degreased in this "boxcar" before paint is applied. Toys ride the 580-foot monorail conveyor through the degreaser, into the paint department, through an oven, then on to final assembly

...on a Miniature Scale

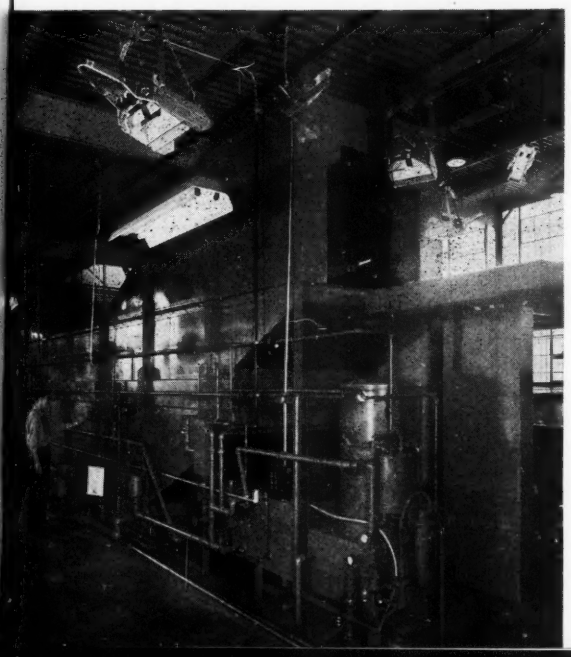
By using mass-fabricating metalworking techniques, a manufacturer of scale model road-building equipment will turn out more than 220,000 units this year

IN the often turbulent toy business, one firm has overcome many problems by applying manufacturing techniques normally found only in appliance and automotive factories. Charles William Doepke Mfg. Co., Rossmoyne, O., has, in five years, become a leader in the trend toward production of realistic toys. Its line of model toys was probably the first to give youngsters manually operated accurate scale models of road-building equipment.

Each of the five toys is scaled to about one-sixteenth the size of the original equipment. The company works from blueprints supplied by the manufacturer or sends its own engineer to a project where one of the monster machines is in operation. All major features are retained.

Prime Steel Used—Toys are made of prime steel, in 16, 18, 20, 22 and 24-gage. Eighteen gage is used primarily. In the newest toy, a model Heiliner, about 25 per cent of the steel is 16-gage and 12 per cent is 20-gage. The scraper blade is 13-gage and the remainder is 18-gage. Steel is obtained from warehouses and direct from Armco, in Middletown, O., about 25 miles from the plant.

In spite of the highly seasonal nature of the business, since most toys are purchased around Christmas, the firm, until the spring of this year, worked 12 months a year on its toys. Estimated production was set up in early January and spaced out for the months ahead. Each month a separate toy was run. If orders increased in the latter part of the year for a particular toy, then production could be changed to fit the demand.



Progressive Dies—Basis of the production is the increasing use of progressive dies combined with spot welding. Dies have as many as seven stations. Normally, they have about three or four. Whenever these dies can be used, they are placed in production. The firm has found that, in spite of the original increased cost of such dies, they more than pay for themselves in lowered labor costs. They are also cheaper than a number of single dies. Most pieces are completely finished in one progressive die. In 1950, normal runs of toys averaged between 25,000 and 30,000 per month. This has been decreased this year by approximately 20 per cent.

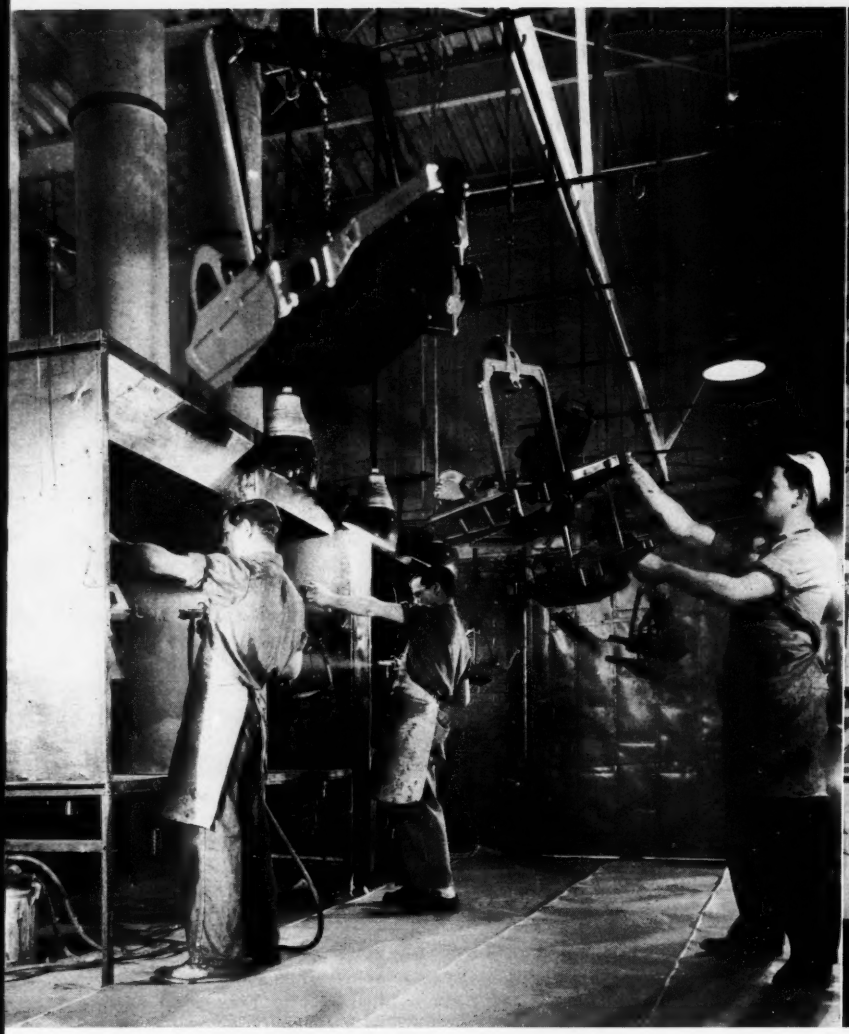
If it were not for the accurate detail needed, costs of tooling could be reduced 25-30 per cent. For the same reason, production costs could be reduced 15-20 per cent. However, success of the toys has been predicated on accurate reproduction plus heavy duty construction that makes them last for years.

All dies are made by outside firms, but two men devote their full time to die maintenance. A completely equipped tool room is located near the final assembly line.

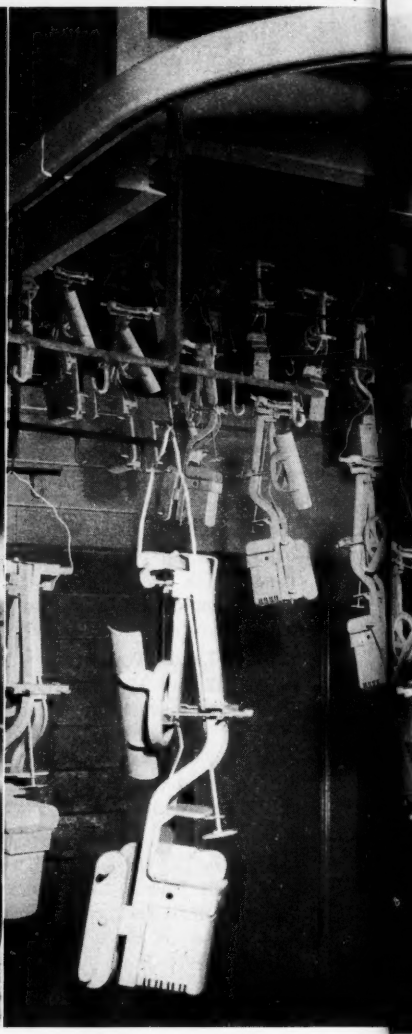
Press Capacity Tripled—Power presses for the dies range from 10 to 150 tons capacity for production runs. Individual press capacity has tripled since 1948. There are 15 presses plus a press brake and shear. Strokes range from 2 to 8 inches.

After the steel has been cut to size and parts stamped, the assembling begins on spot welders. Nineteen welders of various types are used. These include double gun, single gun, rocker arm, and motorized rocker arm types with capacities from 20 to 50 kva. Two lines feed a third line that ends at an inspection point. Since the chassis of each toy is in one piece, the welding joins the parts like axles, cabs, scraper blades, dump doors, engine hoods and steering wheels. A hot upset machine is used for some parts that can't be welded. After passing the inspection point, the toys are hand loaded on a 580-foot monorail conveyor.

They first pass through a spray vapor degreaser using trichloroethylene. Still on the conveyor, they travel to the paint department. Dip, spray, and spray-dip techniques are used, depending on the toy. Red fire engines are dipped, while yellow road graders are sprayed. The new Heiliner, although red, is sprayed. Special fixtures, developed by the plant, hold the toys for spraying. They are adjustable for the length of the toys and can be turned 360 degrees in any direction. A four-man water wash booth and



In the new paint department, toys are dipped in bright paint. Hand spraying finishes the rough spots. Paint is then baked on the steel chassis



Road graders entering and leaving overhead bake oven. Monorail system is similar to that used on much larger automobile assembly lines

four dry booths are used for spraying synthetic enamel.

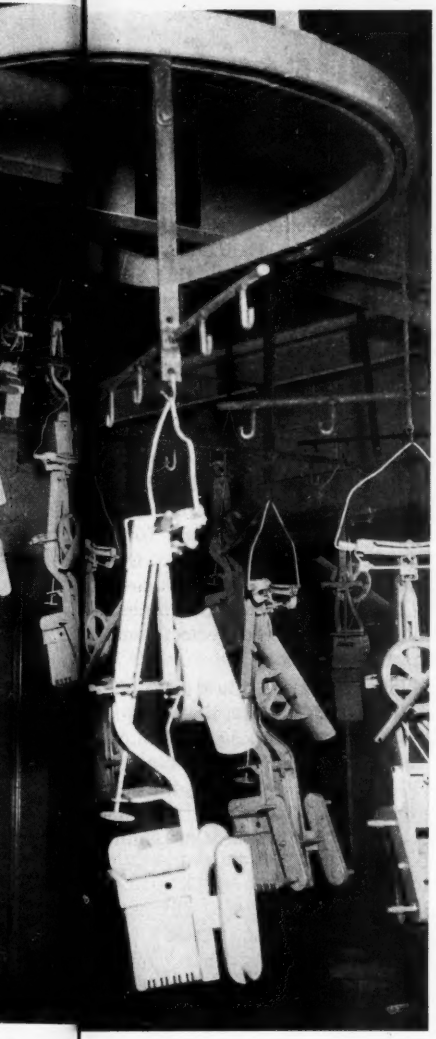
Painted in Solid Colors—Most toys are one solid color, simplifying painting. On a toy like the Heiliner, however, yellow wheels are used. These can be run at the same time by leaving space on the conveyor for trays holding the wheels. The wheels are painted in one booth while the toy is sprayed in another. Some parts are finished in black oxide. This is done by an outside firm.

After painting, the toys are baked in an indirect oil fired recirculating oven for 15 minutes. They move through the oven, on the conveyor, at the rate of 8 feet per minute. Temperature ranges from 275-350° F with a maximum of 400° F.

From the oven, toys travel to final assembly and packing. Here, wheels and tires are mounted. On the American-LaFrance aerial ladder fire truck, the extension ladder, made of aluminum, is attached. Pinion on the ladder-raising mechanism is made of powdered metal. Shoe eyelet machines have been adapted to punch and place eyelets where needed. They are also used as light punch presses on sub-assembly work.

Final assembly is accomplished entirely by hand with special tools like a fastener for mounting hub caps.

Pressure-Mounted Tires—In this same section, tires, made for the company by Goodyear and Firestone as replicas of their own products, are either pressure-mounted on wheels or assembled with other parts on hand-loaded punch presses. These wheels, except those used on the Heiliner, road grader, and bottom dump truck trailer, are die cast. Along with the head-lights on the Heiliner and the searchlight column on the fire engine, they are the only parts that are

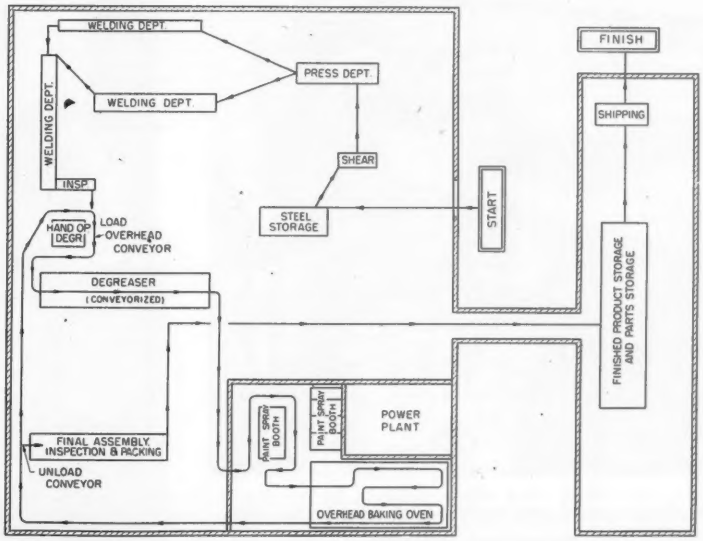


Wheels being assembled and mounted on road grader

die cast. The other wheels are composed of four parts—a tire, two disks and a split bushing.

Until this year, the plant worked 9 hours a day five days a week and 8 hours on Saturday. It would still be maintaining this pace if steel could be obtained. The demand for the toys has risen continuously and some 220,500 will be produced this year as compared with 273,000 in 1950. A new toy is brought out each year and the slowest seller dropped. Among the discontinued toys are a concrete mixer, earth hauler, and bucket loader.

Plant space has increased by one-third this year and includes the new finishing department. With this increase and rising demand, the company is using more and more progressive dies. At the same time, press capacity is constantly increasing and new presses will range to 200 tons, 4 x 7-foot bed areas.



Flow chart showing various production stations

Stainless Steel F

By GILBERT C. CLOSE

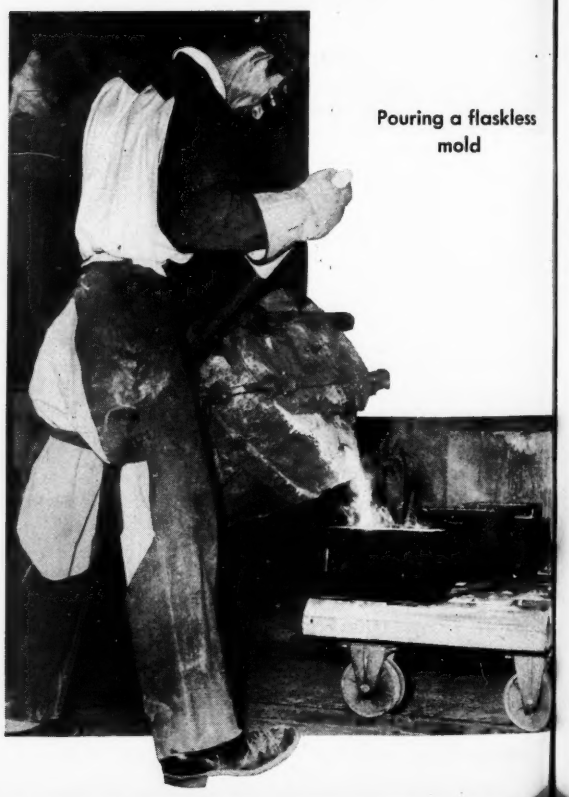
ANSWERING the problem of conserving critical alloys, Solar Aircraft Co., San Diego, Calif., has developed a stainless steel foundry that is the main source of high alloy castings for the company's production line. Conceived as a means of product diversification, the foundry was set up as a research project to explore possibilities of remelting scrap and casting stainless steels in the stabilized 18-8 and super alloy grades using such critical constituents as nickel, chromium, columbium, and tungsten.

44,000 Pounds Monthly—Today the foundry is producing 44,000 pounds of high temperature alloy castings each month, with an increase to at least 70,000 pounds per month planned for the near future. Over 75 per cent of the total charge melted has consisted of scrap generated by other departments in the plant, largely in bits of 18-8 and Inconel sheet from the cutting and trimming departments.

To reduce the use of strategically scarce columbium, the company is developing successful techniques for casting titanium-stabilized stainless. Titanium, available in greater quantities than columbium, has the disadvantages of "fading" rapidly during the casting process, and developing a "dirty" surface and subsurface area of oxides that makes machining

Pouring 321 stainless into an open-top mold

Applying special core wash to give sand better high temperature resistance



Pouring a flaskless mold

Foundry Conserves Critical Alloys

44,000 pounds of high temperature alloy castings per month are being produced by an integrated foundry operating on scrap generated in other parts of the plant. Several "impossible" production jobs of casting type 321 stainless are now routine

difficult and rejections high. Through concerted research, the Solar process has developed to a point where the titanium content is meeting specifications, and the surface and subsurface area is maintained in an oxide-free condition.

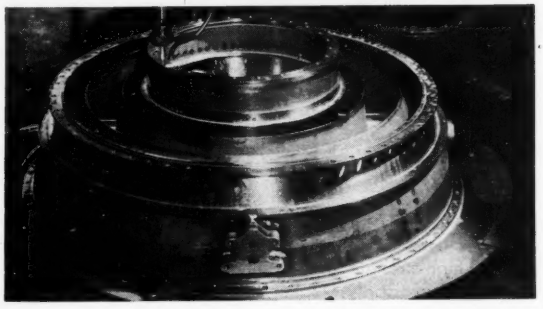
Ignores Convention — Several production jobs of casting 321 are routine now in the Solar foundry whereas two years ago they couldn't be done.

The fuel manifold for one jet engine model always had consisted of a rolled tubing base to which were welded many injector pads. Foundrymen said it could not be made of a single casting. The Solar foundry not only made such a casting; they made one that machined more easily than the forging, included the pads as part of the casting, and eliminated many hours of welding besides retaining its dimensions more closely within the tolerances.

Manufacture of stainless steel exhaust manifolds and jet parts develops an unavoidably high percentage of scrap. Almost half of the original metal is discarded during the various cutting, blanking, piercing, and trimming operations. As work in the fabrication of jet engine parts increased, it soon became apparent that much of this scrap could be remelted and poured into aircraft quality castings for use in the defense program.

Typical parts being produced in the foundry are the inner and outer diffuser cones of the J34 turbojet, tailpipe flange rings for the North American F-86, and flanges and selector valves of the B-36 bomber's exhaust system. Formerly many of these parts were made from forgings, with little thought given to castings for the various components. An experimental exhaust system incorporating parts produced in the foundry proved to be dimensionally more stable than could be obtained with forgings; requests for specification changes were approved by the armed services.

This complicated casting is the diffuser assembly for a Westinghouse 24C jet engine. Formerly forged and welded, it is now cast with better dimensional properties than were previously attained

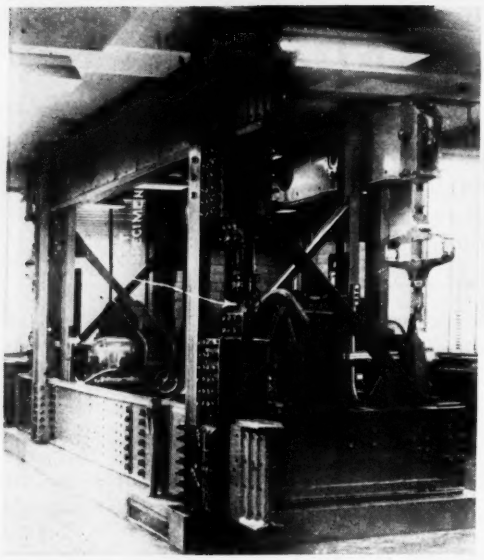


Better Control—Having its own foundry has given Solar greatly increased control over such problems as delivery schedules, priorities and quality. The large amounts of unavoidable scrap in manifold and jet parts production materially assisted the foundry's problem of getting basic materials for melts. Set up as a distinct unit from the production department, the foundry must offer bids for the captive casting business competitive with those of outside foundries as to delivery dates and prices. Inspectors and laboratory technicians check samples from every melt, assuring aircraft quality of all castings.

By having the foundry under the same roof, far closer co-ordination with engineering and pattern-making is possible, and small quantity casting requirements of the experimental department can be more readily met. This close alliance also largely eliminates the problem of scrap segregation, in that scrap of certain compositions from the production floor is delivered directly to the designated bin and is ready for a cleaning process prior to incorporation into the melt. Because chemical analyses of all incoming material are readily available, it becomes a matter of simple computation to decide what basic materials must be added to the melt to assure that castings will meet required chemical and physical specifications.

New Methods—Despite the production nature of the foundry, Solar has continued research control of the project. Through continued research and experimentation, a number of innovations have been incorporated in the foundry practice. For instance, a special core wash is sprayed or painted on all molds and cores, allowing for increased pouring temperatures well over the melting point of the core sand, when such temperatures will assure superior castings of thinner walls and complex design. Research, too, led the foundry away from the use of the conventional sprue system of pouring, and developed a system of gates and risers to insure increasingly better castings and decreased rejections due to hot tears, shrinkage cavities and sand inclusions.

Research has gone hand-in-hand with foundry personnel through each step of the casting process. A balanced silica-sand mixture was developed only after a number of molding sands were tested and rejected. This core sand combines with the core wash to produce castings with a minimum of surface roughness.



250,000-pound testing machine checks fatigue values of riveted and bolted structural joints

HIGH STRENGTH BOLTS

Better Fatigue Resistance For Structural Joints

STRUCTURAL engineers take a page from the automotive engineer's manual as they begin to use high tensile steel bolts in structural joints instead of rivets. High strength bolts have long been used in construction of automobile frames. Structural advantages are all-round superiority and greater economy in comparison with ordinary riveted and bolted connections. They are useful to two main classes of structure. Those subjected to widely fluctuating dynamic loading—bridges, and all parts of certain industrial equipment; and those subjected to static loading.

One factor opposing wider use of high strength bolts is their short supply. Some companies carry certain sizes in stock, but they do not carry a full line. Bolts for many jobs must be made up special. Cost is necessarily high.

Cost of high strength bolts will never be low enough to compare with cost of corresponding plain, undriven rivets. It will be appreciably lower when manufacturers stock them. Industrial Fasteners Institute is surveying industry needs to determine most widely needed bolt sizes. Revised standards of the American Standards Association which equalize specifications for bolts and cap screws will help take high tensile bolts out of the special order class.

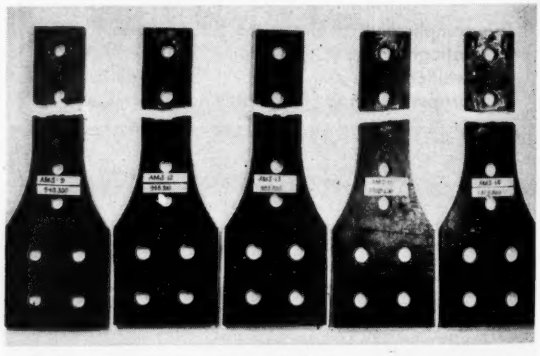
Installation Costs Reduced—Despite the higher cost of the bolts, savings in the cost of installation more than make up the difference, says T. R. Higgins, director of engineering, American Institute of Steel Construction. The institute reports a saving of 11 per cent in the erection of an eight story building through use of high tensile bolts.

Four main factors made the saving possible: Elimination of temporary erection bolts; elimination of transportation of riveting equipment; use of two-man crews to bolt up after erection; production of 400 bolts per crew per day. Impact wrenches were used, which reduces noise of riveting by one half. Where a noiseless operation is required (hospitals) hand torquing is recommended.

Best By Test—Fatigue tests conducted by the Research Council on Riveted & Bolted Structural Joints place high strength steel bolts ahead of rivets in performance. No actual shear stress is experienced by the bolts. Holes are made 1/16-inch larger than the nominal bolt diameters and any slip that occurs in a joint is too small to bring the side of the holes into bearing against the bolts. Friction on the contact surfaces makes the connection shear-resistant. The only stress in the bolts is a nonfluctuating (static) tension stress producing no fatigue. Tabulation of test results shows to what extent high strength bolts, substituted for an equal number of rivets of the same diameter, exhibit superior behavior under fatigue loading:

Type of Fastener	Fatigue Strength—psi 2,000,000 c, full reversal
Cold-driven rivets	14,700
Hot-driven rivets	15,820
High-strength bolts	17,200

Best by Performance—The real proving ground for high strength bolts is actual field application. Mr. Higgins cites the substitution of high strength bolts



Plates used in tests show that in connections made with high-strength bolts, section through the hole is not necessarily weaker than unpunched area

WELDING HERCULOY *plates into a hot water storage generator for the new Veterans' Hospital in Boston.*

ROLLING HERCULOY *plates into cylindrical form for the tanks. Photos from The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.*

Once Again—

HERCULOY

is Chosen for Hot Water Storage Generators

HERCULOY is Revere's Copper-Silicon Bronze, which has the corrosion resistance of copper plus the strength of mild steel. It is therefore ideal for hot water tanks, among many other applications. Much has gone into domestic water heaters, but these are far outstripped in size by a number of large tanks fabricated of Herculoy by The Patterson-Kelley Co., Inc., East Stroudsburg, Pa., for the new Veterans' Hospital in Boston. The water is heated by steam passing through bundles of Revere Phosphorized Copper Tube. Inlet and outlet flanges are Herculoy, made from heavy gauge extruded shells, which offer economies over the alternative method of cupping them out of plate.

Patterson-Kelley weld all these large storage heaters, using Heliarc. Easy weldability is another important quality of Herculoy. Golden beauty is also a feature, and the size and beauty of these tanks created a great deal of comment while they were being trucked to the hospital. . . . Remember Herculoy's qualities: corrosion resistance of copper, strength of mild steel, easy weldability and formability, and beauty. Remember other applications besides tanks, such as: vats, screens, filters, ducts, fire extinguishers, chemical and marine construction.

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for rivets on an ore unloading unit in Cleveland. When the substitution was made, common washers were used instead of the recommended hardened washers. Two months later, testing with a torque wrench disclosed that the eighteen ⅞-inch bolts holding the 175-pound rail down to the main girder were still tight. The twenty-two ⅞-inch bolts used in bracing connections had worked loose and had been retightened several times during the period by maintenance men.

Hardened washers were substituted, and all bolts torquened to 470 lb-ft. The bolts continued in service throughout the eight-month navigation season. At the end of that time, only four had not retained their full clamping force. They were tightened, and a year later inspected again. All bolts were still tight; meanwhile rivets in the joint at the opposite end of the members had loosened.

Specifications Available—The Research Council has a specification covering use of high strength bolts. Specification states high strength bolts may be substituted at the same allowable shear stress for structural steel rivets (ASTM A141) of the same nominal diameter to resist the shear at faying surfaces of any structural steel joint. Holes may have the usual 1/16-inch clearance associated with riveted work and unfinished bolts.

To conform, the bolts must meet ASTM tentative specification for quenched and tempered steel bolts, serial A325. Bolts must also conform to American Standards Association standards for regular semifinished hexagonal head bolts (ASA B18.2) as to threading and other dimensions. Radius of the fillet under the bolt head, however, shall be at least 1/32-inch for bolts larger than ⅝-inch diameter, and at least 3/64-inch for bolts larger than 1-inch diameter.

Specification requires installation of at least one carburized or quenched and tempered washer under each nut and bolt head. Nuts must be tightened to reproduce a bolt tension of not less than 90 per cent of the elastic proof load of the bolt. Checking for tension of between 5 and 10 per cent of the bolts by loosening and retightening under controlled conditions is also specified.

Tightening required by the specifications—90 per cent of the elastic proof load of the bolt—is about three times that required to compress ordinary spring washers. Neither in laboratory tests with 8 million cycles of loading, nor in field installations is there any tendency for a nut to back off. Yet no particular measures are taken to restrain the nuts.

Foundry Sand Methods Discussed

Recent 4-page bulletin available from Beardsley & Piper Division, Pettibone Mulliken Corp., compiles information on various sand operations encountered in modern foundry practice. Bulletin lists various methods of sand mulling, ramming molds and cores and sand conditioning. On-the-job photographs taken of several foundry installations illustrate the text. Copy of the bulletin can be obtained without charge by a request addressed to the company, 2424 N. Cicero Ave., Chicago 29.

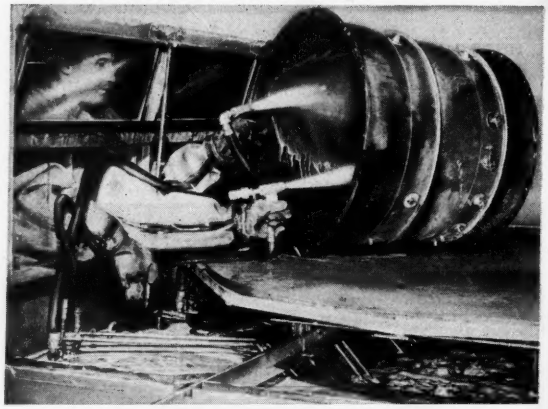
Brochure Describes Gear Chucks

An 8-page brochure describing the company's line of custom-built gear chucks is available from Garrison Machine Works Inc., Dayton, O. Contents include a brief history of the company, description of its consultation, engineering and production facilities and a discussion of the advantages of Garrison's gear chucks. Illustrated are many typical installations where the company's chucks are employed to make a variety of gears.

Unit Wet Blasts Jet Parts

As part of its continuing effort to improve the dependability of aircraft engines, Pratt & Whitney Aircraft engines, Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn., employs a custom-built wet-blasting unit. Cro-Plate Co. Inc., Hartford, Conn., manufactures the equipment used for cleaning experimental jet engine parts after the assembled engine has been run and then disassembled for inspection.

At extremely high temperatures, turbine sections and exhaust ducts become covered with a hard, tough coating of lead sulphate and lead oxide which is literally baked on. Coating must be removed completely to properly inspect parts after test running. Company's inspection calls for the parts to be immersed, after cleaning, in an Xyglo bath and then exposed to black light. Cracks developed during the running of the engine show up clearly, but the parts must be clean. Wet-blasting is the most practicable cleaning method.



WET-BLAST CLEANING AIRCRAFT ENGINE PARTS
. . . enclosed booth protects operator

The custom-built wet-blast unit produces a high velocity transfer of fine abrasive suspended in water in a constantly-agitated state through aspirator jet guns.

Blaster is housed in an 8-foot cube with a 5 x 7-foot opening at the right side of the cabinet. Through this opening can be rolled a 6½-foot turntable for easy loading of large components. Three operators can work at the unit at one time, with each operating one or two wet-blasting guns.

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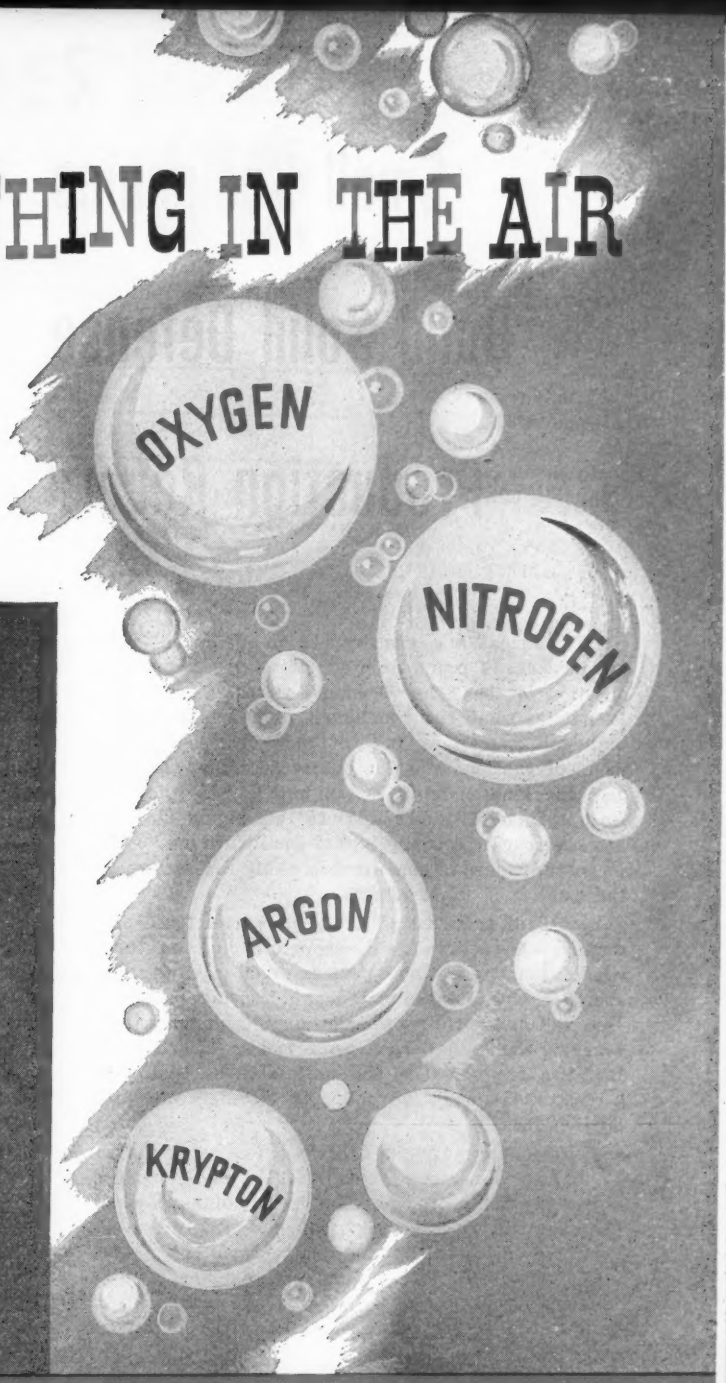


All of the valuable components in the air you breathe can be separated for industrial use in high purity.

OXYGEN for steel production, non-ferrous metallurgic welding and cutting, synthetic fuels and chemical processes;

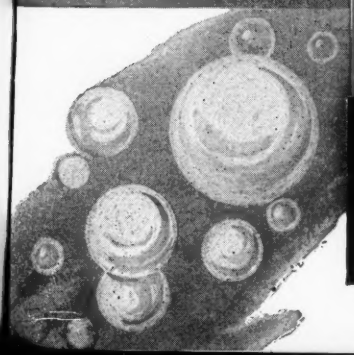
NITROGEN for synthetic ammonia and inert atmospheres;

ARGON for shielded arc welding;

ARGON and **KRYPTON** for incandescent lamps.

Complete plants, using processes based on the developments of Gesellschaft fuer Lindes Eismaschinen, A. G., for producing these gases singly or in combination are furnished to fit your requirements.

Blaw-Knox also furnishes complete Linde plants for the separation of industrial gases such as coke oven gases, natural gas containing nitrogen, purged gases from ammonia synthesis, nitrogen-hydro-carbon mixtures, cracked refinery gases and mixtures of hydrogen or carbon monoxide.



CHEMICAL PLANTS DIVISION

BLAW-KNOX CONSTRUCTION COMPANY

PITTSBURGH • TULSA • NEW YORK • PHILADELPHIA
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Small Companies Build Solid Defense Production Record

Relatively small firms are outperforming the big contractors in production of certain types of ordnance materiel. The 3.5-inch high explosive, antitank rocket is an example

HOW DO small business firms make out in the swelling business of ordnance production? STEEL put this question to the Army Ordnance Corps. The answer is that the small firms make out very satisfactorily—both for themselves and for the government. The usual precautions must be observed so that the firm gets the kind of work it can handle, also that the firm is financially sound. Once this happy juncture has been engineered, the typical small firm may equal or possibly surpass performance of big contractors on the same kind of ordnance.

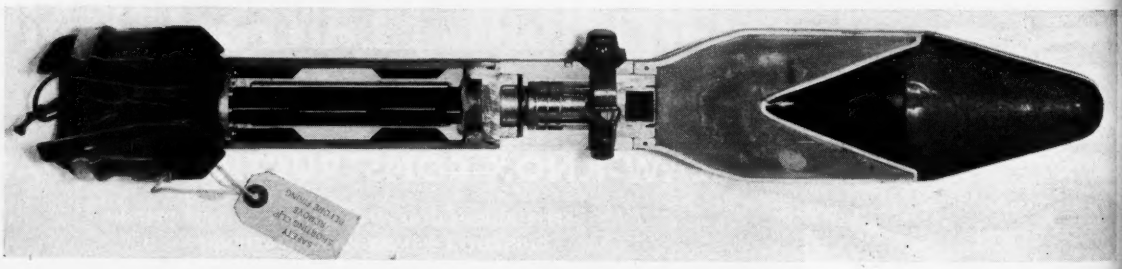
Record of small firms in the present defense production emergency has been outstanding on three counts. Small companies possess great ingenuity and are in the lead in solving manufacturing problems. Due to having few officials in the higher salary brackets their overhead expense is less. Third, their facilities are versatile and up-to-date so that with a reasonable amount of tooling they can get into production fast.

As good, for purposes of illustration, as any other is the story of the 3.5-inch HEAT (high-explosive, anti-tank) M28A2 rocket. This is the ammunition for the dramatic super bazooka that has proved its ability in Korea to destroy any land tank so far revealed by the enemy. Fired from light cast aluminum tubular launchers that are borne on the shoulders of our troops, the rockets are assembled from numerous parts which form these three main units: The motor that carries the rocket to the target, the fuze that ignites the explosive charge, and the head that penetrates the tank armor.

Motor Components — Contractors for the motor metal parts assembly: Evans Products Co., Plymouth, Mich., Heckethorn Mfg. & Supply Co., Littleton, Colo.; Keddy Machine Co., Middleton, Mass., Dexter Co., Fairfield, Ia., Oldsmobile Division of General Motors Corp., Lansing, Mich., Ford Motor Co., Highland Park, Mich., and National Tube Co., McKeesport, Pa. (All contracts were placed after competitive bidding except those of Oldsmobile, Ford and National Tube, which were placed by negotiation. Defense regulations do not permit divulgence of prices in a roundup of this kind.)

Methods of manufacture were developed by the original contractors, the small companies. Evans Products Co. cold-forms the motor from 4140 alloy seamless steel tubing with subsequent heat-treating, and its technique has been adopted by Oldsmobile and Ford. Heckethorn developed a process of hot-forming from 4140 alloy seamless steel tubing; hot-forming also is done by National Tube Co. Dexter Co. has a different process; it uses 4140 alloy seamless tubing, mounts the pieces in a lathe, heats progressively by induction heating, and rolls the venturi end of the motor to shape. Keddy Machine Co. has a process which avoids the use of critically-short seamless tubing; it pierces and hot-works 4140 alloy hot-rolled steel bars to shape.

Cutaway of 3.5-inch rocket. Many small companies are involved in the rocket's manufacture



52 ISSUES

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Thus small companies have demonstrated splendid ingenuity and resourcefulness in pioneering different methods to produce the motor.

Head Metal Parts—Contractors for the head metal parts assembly: Hubeny Bros., Roselle, N. J., Kennedy Van Saun Mfg. & Engineering Co., Danville, Pa., American Stove Co., St. Louis, S. W. Farber Inc., New York City, Oldsmobile Division of General Motors Corp., Lansing, Mich., and National Tube Co., McKeesport, Pa.

Hubeny Bros. was the first contractor on this component, making it from seamless tubing. Hubeny passed its method along to the subsequent contractors, except in the case of Farber Co. which developed its own process. Farber avoids use of critically-short seamless tubing, forming its heads from steel sheet; this method is said to permit accurate control of wall thickness and to keep the weight down. Farbor has made pilot samples that have been approved, and now is preparing to get into early production.

Practice head, M29A2, is gray iron, class 20 weighing the same as the regular HEAT war head. Contractors who got into this business by competitive bidding: Norwalk Lock Co., South Norwalk, Conn., Parsons Fabricating Co., Traverse City, Mich., Inland Equipment Co., Nashville, Tenn. and, more recently, by negotiation, Oldsmobile Division of General Motors Corp., Lansing, Mich. and Ford Motor Co., Highland Park, Mich. The manufacturing process in this case was developed by the original contractor, Norwalk Lock Co.

Fuze Production—Fuze, M404A1. Production techniques were developed simultaneously and independently by the two original contractors, Scovill Mfg. Co., Waterbury, Conn., and Harvey Machine Co., Torrance, Calif. More recently, contracts have been placed with Hoover Mfg. Co., North Canton, O., and Independent Lock Co., Fitchburg, Mass. All these contracts were placed by competitive bidding.

Trap and spacer assembly is the component in which the propellant is evenly spaced and held in place inside the motor body. The contractors who got into this field by competitive bidding: Hesse Machine Co., Boston, also developed, tested and produced this component, Pollak Engineering & Mfg. Co., Newark, N. J., Wald Industries, Huntington, Pa., Metroloy Corp., New Rochelle, N. Y., Ashtabula Bow Socket Co., Ashtabula, O., Kaywood Corp., Benton Harbor, Mich., Keystone Watch Case Co. Division of Riverside Metal Co., Riverside, N. J. Later, negotiated contracts have been placed with Oldsmobile Division of General Motors Corp., Lansing, Mich., Ford Motor Co., Highland Park, Mich., and National Tube Co., McKeesport, Pa.

The trap's manufacture required considerable study. The outer ring of holes in the trap are canted so as to divert the propellant gases into the Venturi throat of the motor body—so that merely a straight drilling operation is precluded. Hesse Machine Co. developed the technique which now is used by all except two of the contractors. The holes are made with a multiple spindle drill, and the canting of the outer ring of holes is obtained by drilling these holes at the proper angles. Recently Metroloy Corp. developed a method of producing the holes by a piercing operation followed by coining. Oldsmobile has adopted the latter method with detailed modifications.

Other Components—Small companies predominate in the production of other components for the 3.5-inch rocket: Metal container M24A1 (for shipping rockets to field troops) produced by Cans Inc., Chicago, and Standard Container Co., Rockaway, N. J.

Squib, M1A1 (for igniting propellant), National Fire Works Ordnance Co., West Hanover, Mass., and Hercules Powder Co., Port Ewen, N. Y. Metal parts for detonator, M41, produced by Rodorn Distributors, New York, and Mattatuck Mfg. Co., Waterbury, Conn. for assembly at Picatinny Arsenal.

Plastic closure, (for keeping propellant and igniter in the motor dry), produced by Republic Molding Co., Chicago, and Wilpet Mfg. Co., Kearny, N. J. Plastic parts for igniter, M2O, produced by Dapol Plastics Inc., Worcester, Mass., and Gilbert Plastics, Hillside, N. J.

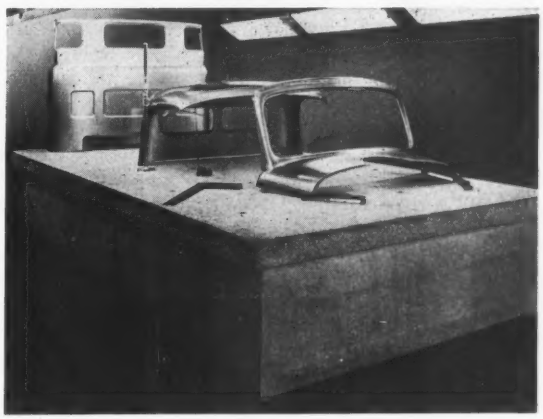
Spring shorting clip, (to prevent premature firing), produced by National Gage Co., Newark, N. J., Kay Mfg. Co., Brooklyn, N. Y., and Eastern Tool & Mfg. Co., Belleville, N. J.

Dust Collection Tips Given

Buell Engineering Co. Inc., offers a booklet titled, "The Collection and Recovery of Industrial Dusts." Subjects discussed are: What dust is; technique in the analysis of dust; factors which influence the choice of equipment.

Booklet also describes various types of the company's equipment for specific industrial jobs. Photographs and diagrams are used throughout the book. Included are discussions of electrostatic precipitation, and combination dust collecting systems. For copies, write the company at 70 Pine St., New York 5.

Bunyan-Size Inspection Table



ONE OF THE LARGEST blocks of granite ever quarried serves as an inspection table at City Auto Stamping Co., Toledo, O. Stone measures 192 x 96 x 32 inches, weighs 50,000 pounds in finished form, and was cut with an overhanging ledge. Lapped to 0.002-inch overall flatness, it is installed on a 32-inch concrete foundation and rests on three rubber cushions

Blast Furnace Practice . . .

II—Thermal Requirements of Shaft

Importance of gas flow through the stack is stressed in this the second installment because of its importance in determining the heat economy of shaft operation

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

TEMPERATURE readings and gas analyses recorded from different planes in the furnace are sustained by Bureau of Mines research at the Southern and Northern furnace operations studied.[2] Burden of the Southern furnace contained a substantial percentage of self-fluxing ore from which carbon dioxide (CO_2) had to be evolved, but the Northern ore burden was virtually free from CO_2. Fluxing stone (CO_2, 45.73 per cent) requirement for the Southern burden was substantially greater than for the Northern burden because of higher ash content in the Southern coke compared to Northern fuel. Differences in percentage of temperature drop between planes in the respective operations, from Plane No. 3 to the furnace top, clearly indicate greater heat consumption in the Southern operation for evolving *combined volatile matter* than for surface moisture, and greater consumption in the Northern operation for evolving *surface moisture* than for combined volatile matter. Comparison of these Bureau of Mines readings is shown in Table 1.

Involves Heat Absorption — After all volatile matter has been evolved from burden materials they must absorb heat to raise them to their fusion temperatures. Bureau of Mines research[2] (Southern furnace) found that slag had begun to form (fusion) at Plane No. 4 (Fig. 1, STEEL, Dec. 10, page 102). Because slag formation is determined by existing temperature, it is reasonable to say location of the plane of formation is a variable, governed by character of raw materials used and the blowing rate, but the Bureau of Mines establishes the approximate location for the end of shaft low temperature work and the beginning of bosh and hearth high temperature work.

Volume of heat required for fusion, per pound of material, will vary with ratio between iron-forming and slag-forming constituents contained in the burden materials. However, with regard to effect of shaft heat requirements on the equilibrium, which must be maintained between shaft preparation capacity and bosh and hearth smelting capacity, the important consideration appears to be ratio of volatile to nonvolatile matter contained in raw materials charged into the furnace because elimination of volatile matter takes heat from the furnace and nonvolatile matter retains it in the furnace. With burden materials containing 100 per cent nonvolatile matter (example sinter) the amount of heat *required* per pound of nonvolatile matter to raise it to its fusion temperature, will not be any different than it will be per pound for the lesser percentage of nonvolatile contained in natural ore from which the sinter was produced.

Charging 100 per cent nonvolatile matter into the top of the furnace permits greater percentage of the charged material weight to pass Plane No. 2 than passes it when natural ore only partially nonvolatile is charged into the furnace. Therefore, all heat absorbed above Plane No. 2 by the 100 per cent nonvolatile matter will be retained by it and returned to the bosh and hearth for further useful work instead of only that part which is absorbed below Plane No. 2 by nonvolatile matter of natural ore.

Uniform Heat Transfer — Similarity of percentages in temperature decreases between Planes 3 and 4 for the two furnace operations (Table 1) indicates more uniform transmission of heat from gas to stock between those planes than occurs between planes higher in the furnace. High and low-temperature readings showing range in temperature through a radius of each of the respective planes[2] are as follows:

	Plane No.			
Temperature	1	2	3	4
High, °F	1320	1694	1800	1908
Low, °F	342	931	1352	1395
Differential, °F,	978	763	448	513

Since stock between Planes Nos. 3 and 4 had been freed from volatile matter it is a reasonable assumption that the nonvolatile property is the cause of the progressively lower range in temperature across the radius of the respective planes and it then becomes a reasonable assumption that when volatile free material is charged into the top of the furnace, there will be approach to the same uniformity of temperature and heat transmission from gas to stock between

planes in the upper section of the shaft as there is in the lower section. In both furnace operations studied by Bureau of Mines research particle size of the natural ores used would range from plus or minus 5 inches to minus 100 mesh and undoubtedly this size range had influence on range of temperature recorded across the radius of the respective planes.

This premise prompts the assumption that the indicated benefit to uniformity of temperature across any plane of the furnace from charging volatile-free material into the top of the furnace would be further enhanced if particle size of the volatile-free material was of smaller range than natural ores. This reasoning is sustained in actual operation by the few furnaces which have used 100 per cent volatile-free iron bearing materials, where characteristic irregularities of soft ore furnace operations of hanging, slipping, and checking, are virtually nonexistent.

Depends on Mechanical Action— Transmission of heat from gas to stock in shaft operation is greatly influenced by conditions governing mechanical action of gas disposal through the stock column. Gas rising from the bosh is the agent for distribution of heat throughout the stock column. Average temperature of gas leaving the bosh must be of the same average temperature as stock in the bosh, and opportunity for heat transmission from gas to stock in the shaft will depend upon the degree of efficiency attained in establishing gas-solid contact between the ascending gas column and between the descending stock column.

Inevitably, in the shaft operation of every blast furnace there is a condition of maximum gas-solid contact consistent with maximum resistance to gas flow without restriction to flow. If the percentage, distribution and character of fines contained in burden offer restriction to flow, benefit can be had from reducing the percentage of fines. However, if reduction is too great, and gas-solid contact is lessened below the ideal, there will be wasteful loss of heat with gas leaving the furnace; if there is reduction in the amount of work required to prepare ore for smelting, as occurs with ore beneficiation methods which eliminate volatile matter before the ore is charged into the furnace, and the blowing rate and heat delivery to the shaft is maintained at the same rate used with volatile bearing ore, there will be concentration of heat in the shaft which can cause fusion there, and formation of scaffolds on the inwall of the furnace.

Maximum resistance without restriction to gas flow assures maximum distribution of gas and heat throughout the stock column. Since heat is absorbed from the surface, inward ratio of surface to mass is the governing factor in the rate of *heat absorption*. Since particle size of materials governs ratio of surface to mass, particle size is the principal factor governing *heat recovery*. Since ratio of volatile to nonvolatile matter contained in raw materials determines the percentage of recovered heat which can be retained in the furnace by the nonvolatile matter, that ratio is the governing factor for *heat economy* in shaft operation.

Factor Influencing Smelting Rate — It is axiomatic that productive capacity of any blast furnace is determined by the rapidity with which materials can be processed, and that the permissible blowing rate is a major factor in that rapidity. Emphasis is placed on the word permissible because it is believed the practical blowing rate for every blast furnace operation will be determined by operating conditions caused by character of raw materials used.

In any furnace operation weight of natural air required per ton of iron will be determined by weight of fuel which must be burned to produce the volume of heat required to process the raw materials because character of raw materials used determines requirements and conditions governing heat recovery. But the rate at which per ton requirements of air may be supplied to the furnace will be determined by relation between preparation capacity of shaft operation and smelting capacity of bosh and hearth operation, a relation which also is governed by character of raw materials. Because the rising gas column takes heat from the bosh and hearth operation, deficiency in smelting capacity tends to retard the permissible blowing rate, and deficiency in preparation capacity, caused by need for additional heat in the shaft, tends to accelerate it.

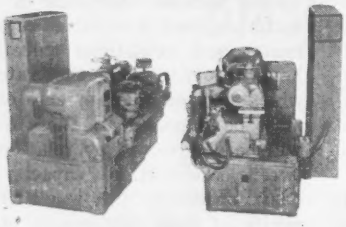
Following combustion of coke at the tuyeres weight of natural air blown into the furnace is increased to the weight of products of combustion. Because of natural laws governing expansion of heated gases the products of combustion tend to increase in volume due to high bosh temperature. Since cubical dimensions of the furnace are fixed the tendency of the gas to expand meets with resistance to passage offered by the stock column and the resistance is reflected in blast pressure, a check to expansion but an increase to velocity. The gas column rising from the bosh passes upward through interstices of the

COMPARISON OF BUREAU OF MINES RECORDINGS

	Southern Furnace*			Northern Furnace**		
Location	**° F**		**%**	**° F**		**%**
Furnace top	334			400		
decrease from Plane 1	66		16.50	325		44.80
Plane 1	400			725		
decrease from Plane 2	470		50.50	576		44.27
Plane 2	870			1301		
decrease from Plane 3	503		36.63	274		17.46
Plane 3	1373			1575		
decrease from Plane 4	194		12.38	152		8.80
Plane 4	1567			1727		
decrease from bosh	895		36.35	645		27.19
Bosh gas	2462			2372		
Carbon dioxide (CO_2)	**Per Cent**			**Per Cent**		
Top gas	9.90			15.00		
decrease from Plane 1	0.40	=	3.88	0.10	=	0.66
Plane 1	10.30			14.90		
decrease from Plane 2	1.84	=	15.00	0.30	=	1.97
Plane 2	12.14			15.20		
increase from Plane 3	3.12	=	34.50	3.30	=	27.73
Plane 3	9.02			11.90		
increase from Plane 4	8.92	=	720.60	6.40	=	116.36
Plane 4	1.10			5.50		

* From Table 17—Technical Paper No. 391.
** From Tables 16, 42, 43 and 45—Technical Paper No. 442.

6 Men



+12 Mona-Matics

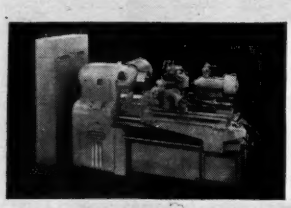
= Savings for Studebaker of 25c per car!

Here's the way Studebaker Corporation cuts costs with Mona-Matics. First, they installed 12 of these high speed, automatic cycle lathes, for operation by 6 men. With these machines they get 6 steering knuckles put on the floor every 68 seconds, with stem end turned complete including face of flange—PLUS 6 steering knuckle pins every 73 seconds, with pin end turned complete. Rough grinding is eliminated in both cases. Day after day, on reductions in actual machining time alone, these twin Mona-Matic operations save Studebaker 25c per car!

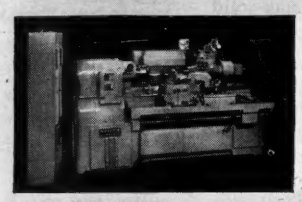
And there's even more to the story. Tracer controlled single point Mona-Matic turning delivers other important production advantages almost equaling, in dollars, the original savings in machining. When you take quicker turning time—add savings in subsequent grinding operations—and then add further savings in tools, tool sharpening and tool change time—you see how Mona-Matics can justify themselves cost-wise on any production line.

How about performance? Auto makers, as concerned with uninterrupted production as they are with costs, rely on Mona-Matics for *unfailing, long-run, high speed automatic cycle turning.* Yet another advantage of this versatile machine is its typically shorter setup time, rarely exceeding 30 minutes, as in the jobs illustrated here. Whether you are concerned with long runs or short ones, you'll find that the Mona-Matic pays its way. Let us send you complete information . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

FOR A GOOD TURN FASTER • • • TURN TO MONARCH



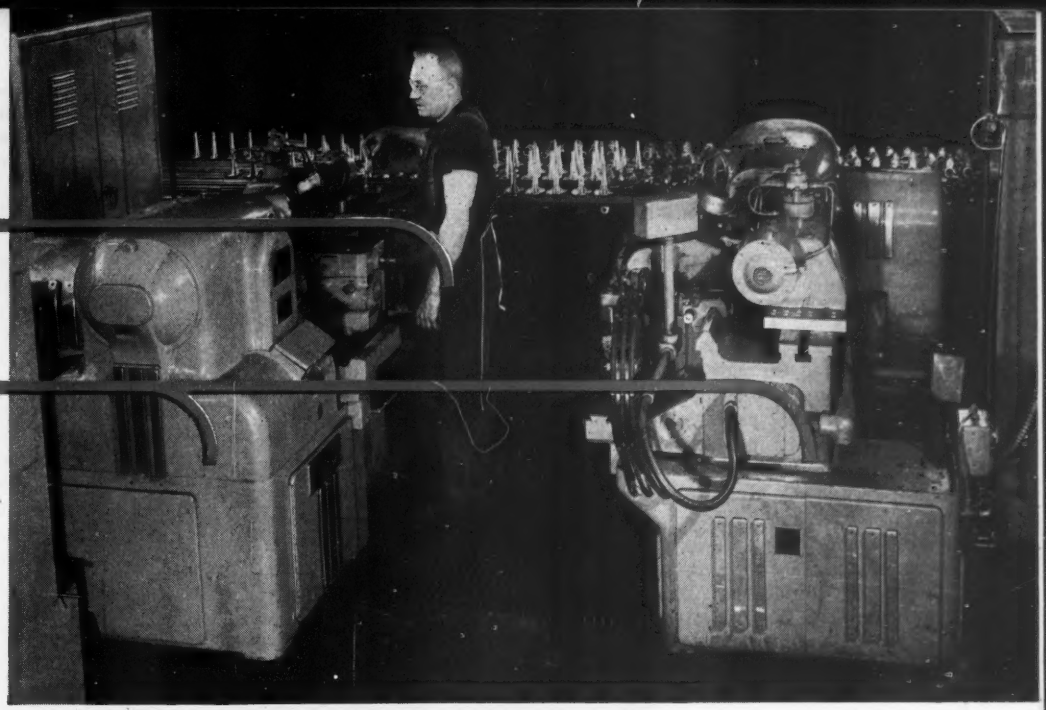
THE MONA-MATIC is a powerful high speed machine suitable for both first and second operation work. Multiple diameters, tapers, faces, radii and chamfers are turned by the single Air-Gage Tracer controlled cutting tool on front carriage. Template contours are reproduced generally to accuracies of + or −.001″ with a smooth, stepless finish because of continuous, single tool cut. Tools on rear slide perform necking, grooving and forming cuts. Set-up time is always less. Tool investment and tool sharpening time hit a new low. And the "Air-Gage Tracer" guided cutting tool often reduces the amount of grinding stock by more than half or eliminates the grinding operation entirely.



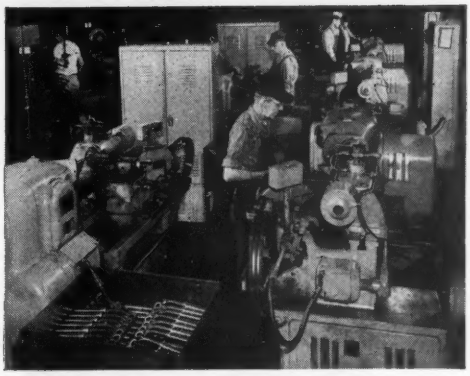
MONA-MATIC WITH MAGAZINE LOADING

This is an automatic lathe (left) in every sense of the word. It goes through the machining cycle automatically; unloads and loads automatically with no more attention required than keeping the magazine filled with work pieces. Cost per piece is tremendously reduced because this permits an operator to handle a battery of such machines.

Tooling is similar to the basic Mona-Matic excepting that the loading magazine takes the place of the regular rear carriage. Recommended for short multiple diameter work having a maximum diameter of no more than 2″.



Above—Part of the steering knuckle line. Automatic speed change, an exclusive Mona-Matic feature, accounts for maximum cutting tool efficiency and extended tool life. Work speed is halved as tool starts out along face of flange.



Left—The steering knuckle pin line. Another Mona-Matic exclusive, the automatic feed change, permits use of four different feeds during the cut. Results—greater accuracy, overall and longer tool life.

Monarch

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TURNING MACHINES

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

Gentlemen: Please send without obligation your illustrated Booklet No. 1804-1 giving complete information on the Monarch Mona-Matic.

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stock column and the variable nature and extent of operating conditions encountered can readily be appreciated when consideration is given to the fact that with different classes of raw materials weight of natural air required per ton of iron will vary in air/iron ratio from 2:1 to 4:1.

Serves as Distributing Agent—Passage of gas through the stock column in the shaft is mechanical action and in that passage it acts as the agent for distribution of heat throughout the column. Consequently, for any given volume of gas produced at the tuyeres its volume when leaving the bosh will be determined by temperature of stock at the top of the bosh. With transmission of heat from gas to stock in the shaft, the tendency of the gas to expand is checked and its volume is reduced proportionately. Progressive decrease in diameter of the furnace shell, from the straight section above the mantle to the furnace top, tends to counteract effect of reduction in volume and there is not as great reduction in the average velocity of gas between planes as might be expected. Average volume and velocity of gas at different planes measured by Bureau of Mines research at the Northern furnace operation[2] are as follows:

	Plane No.			
	1	2	3	4
Volume of gas, cfs.	27,304.4	39,174.0	39,441.5	36,996.0
Velocity of gas, cfs per sq ft of plane .	10.30	12.90	10.49	6.44

These are average figures, with velocity measurements across a radius of the respective planes covering a wide range. Emphasis is placed on the fact that the measurements were made at a furnace using ores from the Great Lakes region and a fast blowing rate; therefore, they are indicative of shaft operations having similar operating conditions caused by ores from other sources which have characteristics similar to Lake ores. However, they are not necessarily conclusive for shaft conditions on furnaces using ores which have entirely different characteristics or blowing rates. Actual conditions at furnaces using fully beneficiated ores and other volatile free materials for 100 per cent of the burden indicate more uniform flow of gas through the shaft than is indicated by Bureau of Mines measurements for natural ore operations but unfortunately similar quantitative measurements are not available for comparison.

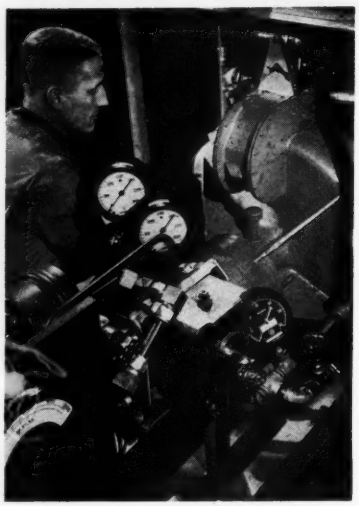
In any furnace operation, importance of gas flow through the shaft cannot be overstressed because it is an important factor in determining heat economy of shaft operation. Moreover, the lifting power of the volume and velocity of gas passing through the stock, in relation to force of gravity exerted on fines contained in the stock, determines flue dust production for the operation. Since fines are necessary for efficient recovery of heat, and since the volume of gas is necessary for delivery and dissemination of heat, the relation of one to the other constitutes one of the critical phases of shaft operation.

Requires Uniform Balance—Since work performed in the shaft is both thermal and mechanical equilibrium must be maintained between the two divisions. With low-cost fuel commercial considerations may justify sacrifice of some heat. Actual furnace operation indicates that as long as thermal reactions in shaft operation can be performed without causing fusion there, gas volume (the blowing rate) can be increased until the critical mechanical condition of gas volume and velocity is reached where flue dust production becomes economically prohibitive. If fines are removed from the furnace burden the dust production ceases to be a factor, but sacrifice of heat and danger of heat concentration which can cause fusion in the shaft then will be accentuated because of lessened gas-solid contact and reduction in heat recovery. With or without flue dust consideration and with ores containing combined volatile matter the velocity of gas through the zone between Planes Nos. 2 and 3 may be increased to a degree which will prevent concentration of heat thus causing fusion in that area.

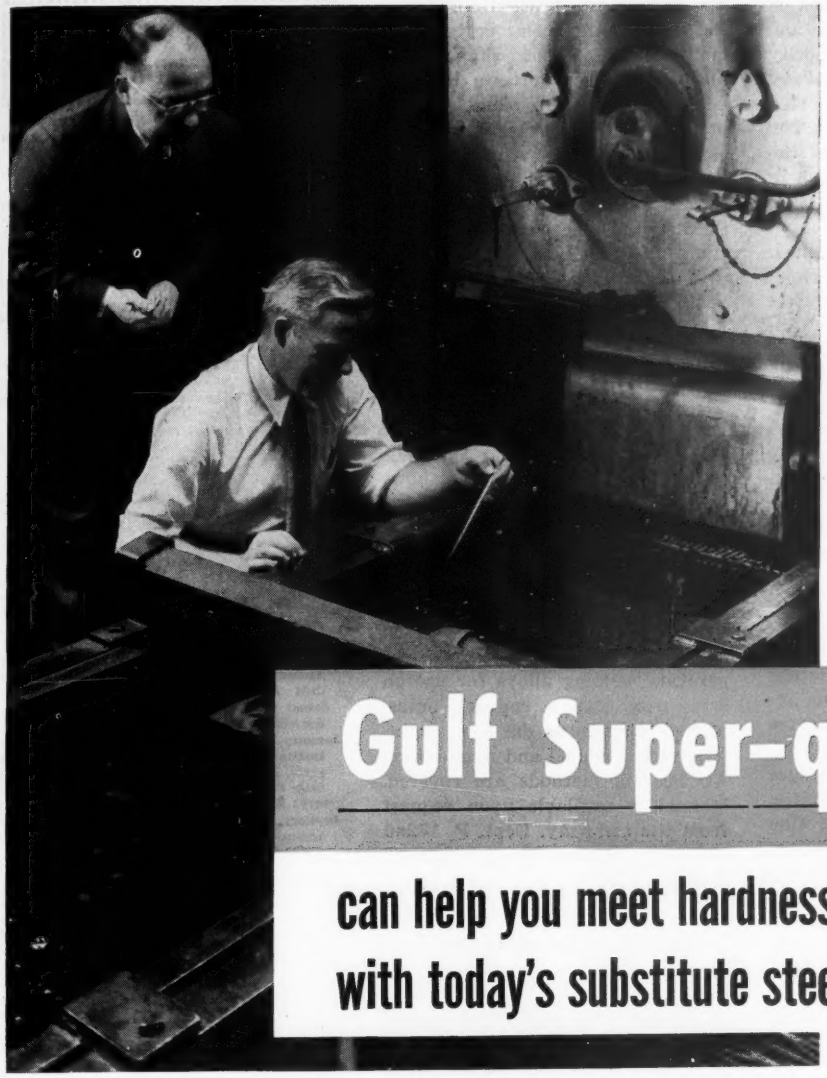
Use of water on the stock will safeguard any ill effect of heat above Plane No. 2, but again the economic factor of prohibitive sacrifice of heat is accentuated. If combined volatile matter is eliminated from the burden materials before they are charged into the furnace, the need for controlling the gas velocity through the zone between Planes Nos. 2 and 3 at a rate that will prevent concentration of heat and fusion there becomes increased in proportion to the amount of volatile matter removed from the materials. Therefore, as the need increases the economic factor of prohibitive sacrifice of heat is accentuated.

Factor Impelling Fast Blowing—Considering shaft operation alone, with the three operating conditions cited where flue dust production is not a factor, possible use of fast flowing practice would be determined by the relation between the velocity of the gas through the zone between Planes Nos. 2 and 3 and the heat absorption rate of stock between the planes. But considering furnace op-

Camera Unties Industrial Knots



TOUGH industrial questions like what causes chattering of a high speed tool cutting steel in a lathe and similar puzzlers are brought one step nearer solution with the development of an ultra high speed motion picture camera by Battelle Memorial Institute, Columbus, O. Although it looks like a mass of complicated plumbing, the camera is designed to take pictures at speeds up to 100,000 frames per second. It resolves 30 to 40 lines per millimeter on 8 mm film. A single photographic series of 500 frames can be projected as a motion picture immediately after development of the film without reprinting or reregistering of frames



Gulf Super-quench

can help you meet hardness specifications with today's substitute steels

Is the current alloy shortage creating a heat-treating problem for you? Must you accept alloy steels with less chromium, manganese, molybdenum, or vanadium than you originally specified? Then you'll be interested in the performance of Gulf Super-quench. Because of its dual-quenching power, this outstanding quenching oil helps offset the lower hardenability of today's substitute steels.

Gulf Super-quench passes through the vapor stage far more quickly than conventional quenching oils. This means that the quenching temperature falls extremely fast at the outset, an important factor in the depth and uniformity of hardening. In the succeeding cooling stages Gulf Super-quench has a slow cooling rate, like that of conventional quenching oils, and the same minimum tendency toward distortion and cracking.

Greater quenching power of Gulf Super-quench adds up to greater depth of hardening and more uniform hardness! One of the most practical advantages of Gulf Super-quench is greater uniformity of results on steels of variable hardenability.

For further information on Gulf Super-quench call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pennsylvania.

FIFTY YEARS OF SERVICE
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PETROLEUM AND ITS PRODUCTS

eration as a whole, conditions in shaft operation are not the determining factor because velocity of gas is largely determined by volume of air which is converted to gas in the hearth and bosh. The gas entering the shaft from the bosh drains heat from the bosh in proportion to its volume and weight. Since the critical hearth temperature must be maintained, the controlling factor for the blowing rate then becomes the critical relation between need for heat in bosh and hearth operation and the amount of heat drained from the bosh and hearth by gas.

Conceivably there is a critical condition caused by the blowing rate where heat must be supplied to the bosh and hearth to compensate for heat drained from the top of the shaft by gas leaving the furnace. Under such a condition additional heat supplied to the bosh and hearth would not confer any benefit whatsoever to the furnace operation. But again considering shaft operation alone, known actual furnace operation indicates that with burden materials containing substantial percentages of surface and combined volatile matter, and a percentage of fine particles, the critical mechanical condition of dust production will be reached before the critical thermal condition of heat concentration which will cause fusion in the shaft. With burden materials, which are free from volatile matter and fine particles, the critical thermal condition will be reached before the critical mechanical condition of excess dust production.

New Spray Forming For Metals

Office of Technical Services, U. S. Department of Commerce, announces a new spray-forming technique for fabricating large complex parts of high melting point metals. Process is the outgrowth of a research project for the Navy Bureau of Ordnance by M. I. T. scientists which first uncovered the exact process by which a spray-metal deposit is built up.

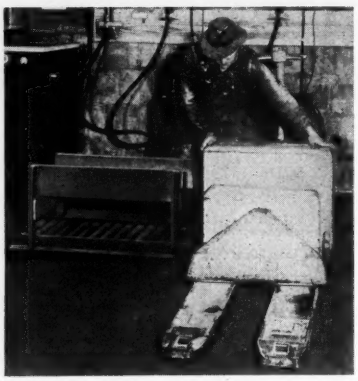
From this knowledge evolved the new process in which metal is sprayed onto a core of the desired shape and the sprayed deposit then sintered to form a dense strong, metal part. Method provides a simple inexpensive process for forming high-melting point parts, especially large, complex shapes that are difficult to fabricate by conventional processes. High-melting point alloys and elementary metals can be formed by the process. The report describes the new spray forming technique, properties of the deposits, and explains how the sintering produces the densification or strengthening of the metal.

Revised Welding Manual Out

Eutectic Welding Alloys Corp. announces publication of the 4th edition of "Manual of Welding Design and Engineering." New edition contains latest data and how-to-do-it articles illustrated with application drawings, weld diagrams, tables on melting temperatures, tensile strengths and corrosion factors.

Detailed information is given on over 100 different eutectic low temperature welding alloys for use on cast iron, steel, copper, brass, bronze, aluminum, die cast, stainless, nickel, monel and magnesium. All heating methods are covered. Manual is available upon request from the company, Dept. P, 172nd St. and Northern Blvd., Flushing, New York 58.

Truck Battery Handling Eased



LIFTING and the need for an overhead crane in handling industrial truck batteries are eliminated with a device reported by Gould-National Batteries Inc. The cart devised by Distribution Terminal Warehouse, Cleveland, uses a 4-foot section of a roller conveyor as a bed. Other components include four 2-foot sections of structural angle iron, four casters and some scrap wood

CALENDAR OF MEETINGS

January 8, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York.

January 8-10, National Constructors Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13-15, Institute of Scrap Iron & Steel: Annual meeting and exhibit, Waldorf-Astoria Hotel, New York. Institute address: 1729 H St., NW, Washington. Executive vice president: Edwin C. Barringer.

January 14-17, American Management Association: General management conference, Biltmore Hotel, Los Angeles. Address: 330 W. 42nd St., New York.

January 14-17, Plant Maintenance Show: Convention Hall, Philadelphia. Manager: Clapp & Poliak Inc. Address: 341 Madison Ave., New York.

January 14-18, Society of Automotive Engineers: Annual meeting & engineering display, Hotel Book-Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 16-17, Steel Shipping Container Institute: Winter meeting, Pierre & Hampshire House, New York. Institute address, 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 16-18, Southern Industrial Distributors Association: Mid-year meeting, Edgewater Gulf Hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: E. L. Pugh.

January 17, American Coke & Coal Chemicals Institute: Western regional meeting, Congress Hotel, Chicago. Institute address: 711 14th St. NW, Washington. Executive secretary: Samuel Weiss.

January 18, Malleable Founders Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

January 18-19, American Medical Association, Council on Industrial Health: Annual meeting, William Penn Hotel, Pittsburgh. Association address: 535 N. Dearborn St., Chicago 18. Secretary: Dr. C. M. Patterson.

January 21-22, Industrial Furnace Manufacturers Association: Mid-winter meeting, Schenley Hotel, Pittsburgh. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

January 21-24, American Roadbuilders Association: 50th anniversary meeting, Hotel Rice, Houston. Association address: 1319 F St. NW, Washington 4. Secretary & executive vice president: Lt. Gen. Eugene Reybold.

January 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

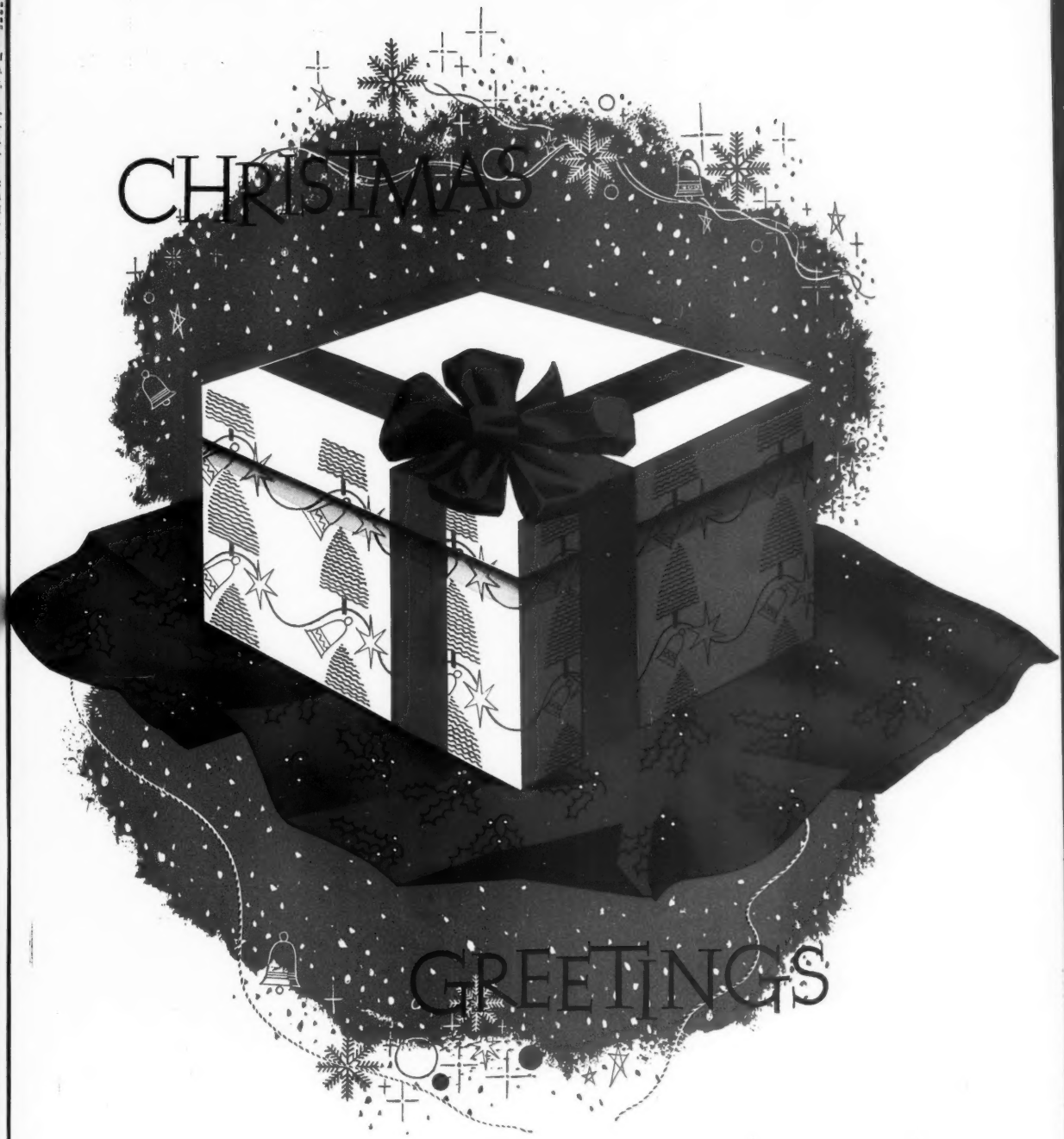
January 23-24, National Industrial Conference Board: Winter meeting, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant director, conference division: (Mrs.) I. E. Brown.

January 24-25, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago 5. Secretary: J. Dwight Evans.

January 27-31, Associated Equipment Distributors Association: Annual meeting, Hotel Stevens, Chicago. Association address: 360 Michigan Ave., Chicago. Secretary: P. D. Herman.

January 28-30, Truck-Trailer Manufacturers Association: Annual meeting, Shamrock Hotel Houston. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 31-February 1, American Society for Metals: Mid-winter meeting, William Penn Hotel, Pittsburgh. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.



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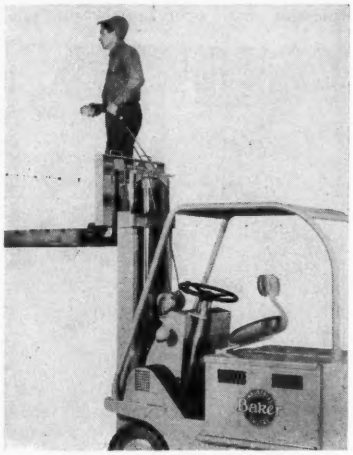
Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

New Products and Equipment

Forks Run by Remote Control

USE REPLY CARD—CIRCLE No. 1

Remote control attachment for all its fork truck models has been developed by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O. Attachment allows truck operators to control lifting and lowering action of the fork at a distance from the truck's control panel. In its primary industrial application, it provides a way to get at infrequently used stock stored in hard-to-reach bins.



. . . lift becomes portable work platform

Operators can use pallets with guard rails as portable work platforms, standing on pallets and raising forks to stop desired (see cut). Lifting and lowering in this operation is controlled by a small remote control unit in operator's hand. During normal truck operations, control unit clamps over the tie bar on truck's inner upright. Control cable is housed in reels, under tension, to prevent kinking. Reels have sufficient cable to permit units to reach truck's standard lift limit.

Viewer Widens Density Range

USE REPLY CARD—CIRCLE No. 2

An iris-diaphragmed, high-intensity viewer announced by General Electric Co., 4855 Electric Ave., Milwaukee 14, Wis., allows study of a wide range of x-ray film densities in the industrial field. Density range is made possible by two features: Opening can be dilated or contracted steplessly from a ¼-inch triangle to a 5-inch diameter circle, concentrating light on the area in question; and lamp in use is a 100,000 candlepower unit with average life of 1000 hours at 115 v.

Film densities from 0.5 to 4.5 are penetrated by the illuminator. This permits radiographer to diagnose an object of varying thickness with only one exposure. Need for retakes on over-exposed film is eliminated because operator can see through such films by turning up the light intensity.

Stand Tests Flexible Hose

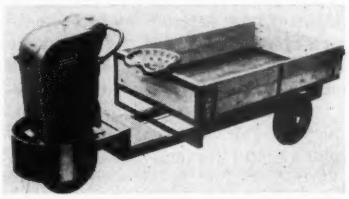
USE REPLY CARD—CIRCLE No. 3

Hydraulic test stand developed by Superdraulic Corp., 14256 Wyoming Ave., Detroit 4, Mich., is made for testing flexible hose in aircraft. Using large volume pumps, stand provides test pressure to 5000 psi; with special booster equipment, to 30,000 psi. Hydraulic design can be modified to include accumulator or cycling equipment and timing devices. Other modifications will permit use of any type hydraulic oil for test purposes. In addition to its primary purpose as a hose tester, the unit can be adapted to testing valves and cylinders.

General Purpose Handling Truck

USE REPLY CARD—CIRCLE No. 4

General purpose handling truck, model 332, is introduced by Hambro Machinery Division, Powerad Co., 350 Fifth Ave., New York, N. Y. Gasoline driven, 3-hp engine has three-speed and reverse gear box. Gear ratios are available to meet varying conditions and loads; road speeds range to 10½ mph. Truck has steel body, low wooden floor having 18 inches clearance, 12-inch hinged sides and pan-type tractor seat. Power unit gets forward protection from a heavy steel plate bumper. Its overall length is 8 feet, 6 inches; width is 3 feet, 4 inches; and road capacity, 1 ton. The company has recently introduced a complete range of material handling equipment, including lines of low-load trucks, motor tugs, tipping and platform trucks, mobile cranes and fork lifts.



. . . has three-speed and reverse gear box

REPLY CARDS

on page 83 will bring you more information on any new products and equipment in this section.

Combined Pump and Filter

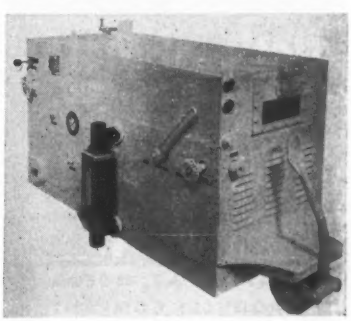
USE REPLY CARD—CIRCLE No. 5

Combination pump and filter unit, No. 48380, designed for filtering water and other liquids used in leak test tanks is offered by Ruthman Machinery Co., Cincinnati 2, O. Unit is semi-portable, suitable for tanks to 1000 gallons used with the company's motor driven pump. Pump is a bronze Rumaco model 2-C, with 1½ hp heavy duty driving motor. Its capacity of approximately 2000 gallons per hour at 36 pounds pressure completely circulates liquid through the filter twice each hour. Unit is equipped with a bronze filter, model 6-A1 with six cartridges of medium density.

Portable Hydraulic Power Unit

USE REPLY CARD—CIRCLE No. 6

Heavy-duty portable hydraulic power unit that provides power for testing equipment, modernizing older machinery and serves emergency functions, is announcd by Rucker Co., 4228 Hollis St., Oakland 8, Calif. Unit is towed easily to operate anywhere electric power is available. It is most efficient when used in testing automotive and aviation equip-



. . . runs testers: boosts old machines

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ment or powering machine tools and processing machinery.

Power units are built with fixed volume pumps in sizes to 60 gallons per minute at 2000 psi. Hand wheel and pressure compensated controls permit meeting specific job needs to 5000 psi and 75 hp. Pump can take suction from built-in 100-gallon tank or an outside source through multiple valve combinations and hand control of two pressure lines. Micronic filter, built-in relief valve flowmeter, pressure gages and electric controls are mounted in a heavy welded steel frame. All are built to J.I.C. specifications.

Starting Pad Assures Die Marks

USE REPLY CARD—CIRCLE No. 7

Assured uniform depth of impressions on parts is attributed to a standard inclined plane starting pad incorporated on roll marking dies made by New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7, Mich. Design also aids the screw machine operator in tooling setup, since special cams or feeds on the machine are not required. Other improvements on the marker, designated model 500-C, include placing center of roll die in line with shank's top for easier locating of holder during setup; ratchet pawl mechanism is simplified and trips roll-die to reset it during the last ⅛ to 3/16-inch of stroke; and use of solid instead of split yoke construction.

Elevator-Type Lift Truck

USE REPLY CARD—CIRCLE No. 8

Mobile elevator-type lift truck, the Uplifter, is offered by Revolvator Co., North Bergen, N. J. Truck has optional load limits of 500 or 1000 pounds. Limit is selected by adjusting the lift cable that extends through a bottom sheave and is pinned to the top of the frame. Turning radius is 41 inches; lifting platform is 24 x 24 inches. Handle pressure per crank turn for 1000 pounds lift is 17 pounds; for 500 pounds pressure, 19 pounds. Unit has a 62-inch lift; overall height is 77 inches.

Machine Tender Eases Handling

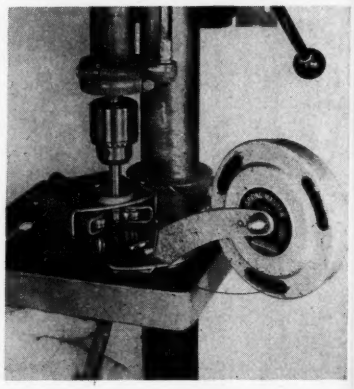
USE REPLY CARD—CIRCLE No. 9

Machine tender that handles light weight parts in factory and warehouse operation is offered by Palmer-Shile Co., 16025 Fullerton, Detroit 27, Mich. Tender is built of sheet steel and angle iron in all welded construction. Tubular handle at swivel end is used to guide and propel the tool. Handler is 30 inches long, 16 inches wide and 32 inches high. Top deck is 2 inches deep; lower is 3 inches deep and both have turned edges all around. Wheels are 5 x 1 inch, plain bearing, the two at the rear or handle end being swivel. Use of rubber tired wheels is optional. Handler weighs about 65 pounds.

Press Becomes Spring Maker

USE REPLY CARD—CIRCLE No. 10

Springs can be wound on a standard drill press through an attachment made by DoAll Co., Des Plaines, Ill. Spring manufacturing tool can be applied to any press having 1-inch chuck or larger. One experienced operator can operate several machines, since replacing wire spools is the only attention needed after setup.



. . . adapter winds 8-28 gage wire

Unlimited variety of extension and compression springs can be produced on the attachment, called Spring-Master. It winds wire diameters from No. 8 (0.020-inch) to 28-gage (0.071-inch) and outside diameter of finished springs can be varied from 3/16 to ⅝-inch. Pitch of a compression spring can be infinitely varied while the machine is running. Built-in adjustable wire guide for use in making extension springs provides for increase in tension of wire to degree needed to give completed spring maximum efficiency in operation.

Motor Ratios Reach 175:1

USE REPLY CARD—CIRCLE No. 11

Triple reduction gearing in its type GM Syncrogear permits U. S. Electrical Motors Inc., Los Angeles 54, Calif., to offer a high torque, low speed motor capable of ratios to 175:1. Effective torque rating is doubled by using two secondary pinions driving the output gear. Splined herringbone pinion distributes load equally between the two pinions. As an efficient, high speed motor with

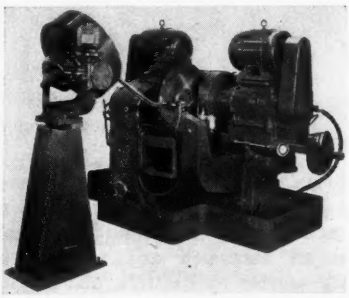
torque multiplying, built-in gearing, the unit reduces amount of space necessary to house this type drive. Available in 1 to 10 hp with speed ranges of 5 to 25 rpm, motor has advanced features of normalized castings, asbestos-protected windings and solid centricast rotor.

Grinder Has Automatic Feeder

USE REPLY CARD—CIRCLE No. 12

Gardner Machine Co., Beloit, Wis., offers its No. 115, 18-inch double spindle grinder for grinding both flat surfaces of carburetor valve seats in one operation. Head slides move on ball bearing ways upon the cast iron base. Heads can be pivoted so abrasive disks will be set at best grinding angle. Abrasive disks are 18 inches diameter, carried on heavy precision spindles.

Rotary work carrier brings parts between abrasives where hopper feeder moves them down a chute. At



. . . works both surfaces in one operation

this point, a pneumatic transfer device rapidly snaps them into the rotating carrier. Valve seats are ejected automatically after grinding. Production averages 40 to 50 pieces per minute, removing 0.006-inch overall stock. Tolerances maintained are: Flatness, 0.0005-inch; parallelism, 0.001-inch; and uniformity, 0.001-inch.

Meter Provides Process Control

USE REPLY CARD—CIRCLE No. 13

Contact meters, developed by Assembly Products Inc., Main at Bell Sts., Chagrin Falls 1, O., provide automatic locking relays for sensitive control of almost any chemical process or mechanical operation. Relays are effected through either alarm and automatic shut-off or continuous on and off control. Industrial applications include use to give warning signals of varying temperatures on turbines and generators; control of carbon feed in carbon arc furnaces; and for a variety of automatic speed controls for machines and conveyors.

Called the Simplytrol, standard meter-relays are designed for high limit controls, but are available also for low limit and both high and low limit contact. Meters give full scale current ranges from 0 to 20 microamperes and voltage ranges from 0 to 5 millivolts.

Bed Turret Is Self-Indexing

USE REPLY CARD—CIRCLE No. 14

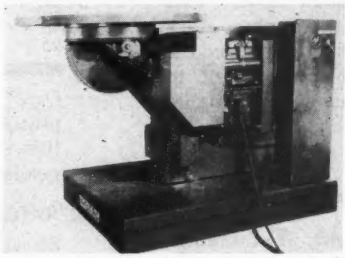
Self-indexing bed turret for use on most standard lathes, swinging from 9 to 12 inches is announced by Globe Heat-Seal Inc., 3380 S. Robertson Blvd., Los Angeles 34, Calif. Turret's mechanism is linked to automatic stop rods that limit stroke length and can be set for any requirement to full slide working stroke of 5¼ inches. Total slide travel is 6 inches. Turret is guided in rotation by a large diameter pilot, integrally cast, that engages a mating bearing in the slide. Flat bearing surfaces between ram and turret are hand-scraped for precise fit.

Entire work load is applied to the pilot and flat bearing surfaces, resulting in extreme rigidity and freedom from deflection. Hexagonal turret is provided with flat faces that accommodate flanged tool holders and that may be bored for straight shank tools. Indexing is done by a spring-loaded tapered pin, sliding in a sleeve and engaging a mating tapered bushing in the turret. Tapers take-up automatically for wear and insure accuracy of location.

Automatic Welding Positioner

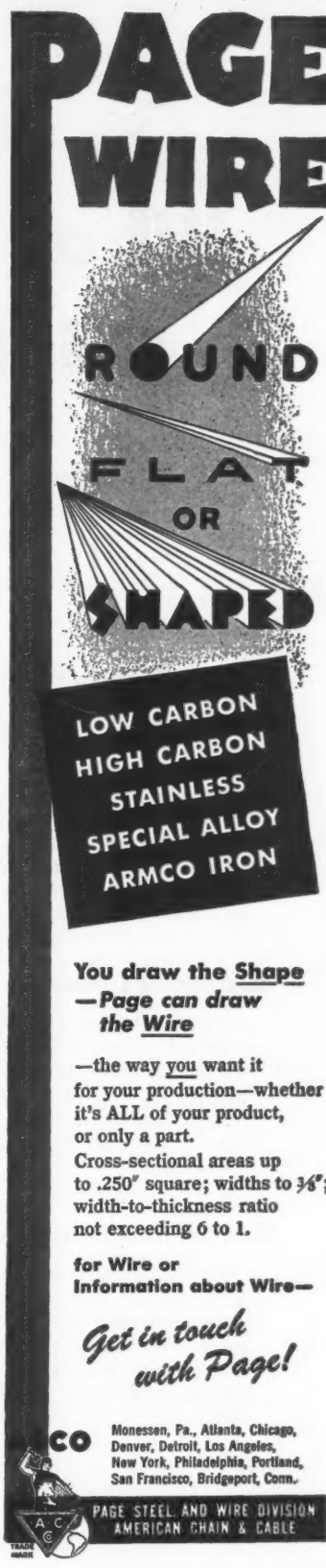
USE REPLY CARD—CIRCLE No. 15

Precision automatic welding positioner, the model 21, is offered by Aronson Machine Co., Arcade, N.Y. Table rotates at infinitely variable speeds from 0 to 2.7 rpm, and at 4



. . . has both variable and constant speeds

rpm constant speed for quick positioning. Remote push button control station makes either variable or constant speed available immediately. Precise table speeds are indicated as close as 0.025 rpm on an electric generator tachometer. Rotation motor runs during the welding cycle, allowing instant start and stop of the table through I.C.B. electric



What are metalworking executives thinking and planning for

Dear Reader:

On Monday, January 7 we will once again publish our annual Metalworking Yearbook issue of STEEL.

As a regular reader of STEEL I thought you might like to have an advance report on how this special issue is shaping up and what you will want to look for when it reaches you.

In the 1952 Yearbook you will find four main features which will dig deeply into metalworking's present and future problems:

Metalworking's Destiny

This penetrating analysis will be published as a special insert in the YEARBOOK issue. This article will touch on some of the somber, stark realities as well as the brighter notes on the road to tomorrow when Americans expect to enjoy a standard of living many times higher than today.

What Are Metalworking Executives Thinking?

Through grass-roots interviews, in all branches of industry and government, STEEL will "listen-in" on what metalworking executives and government officials are thinking and planning. This feature will report on the metalworking industry's problems and how it expects to cope with them.

How To Do Business Under Government Controls

STEEL's Editors will report and explain where metalworking stands on various control orders affecting materials, components and equipment. This will be an extension and roundup of STEEL's weekly service on controls, and will be written with the assistance of industry men in government.

1952 Forum On Technical Progress

One hundred and fifty leading engineers and metallurgists will report on what's ahead technically. Six sections have been established to cover every phase of metalworking.

1. **METALS PRODUCTION**
   Ores and their treatment.—Blast furnace practice.—Openhearth, electric furnace practice.—Rolling mill practice.—Pickling, annealing, etc.—Non-ferrous metals.
2. **MATERIALS and COMPONENTS**
   Selection and specification of cast iron and steel, metals, components, etc.—Alternates and substitutes.—Design.—Metallurgy.
3. **PROCESSING METHODS**
   Heat treating.—Machining and tooling.—Stamping and forming.—Punching, shearing,

ngexecutives
ngfor 1952?

bending.—Forging and cold-heading.—Sand, permanent mold and die casting.

4. **FASTENING AND ASSEMBLING**
Welding.—Brazing and soldering.—Riveting, bolting and other fastening methods.—Assembly methods.

5. **CLEANING and FINISHING**
Chemical and mechanical cleaning.—Chemical surface treatments.—Electroplating and polishing. — Galvanizing. — Painting, enameling and lacquering.—Metal spraying.

6. **MANUFACTURING and ENGINEERING SERVICES**
Materials handling.—Inspection and testing. —Quality control.—Plant maintenance and servicing.—Temperature and humidity control.—Lubrication.—Dust and fume control. —Safety and fire control.—Lighting.—Power and power transmission.—Miscellaneous services.

In Addition . . .

—A special article on what to expect from Washington in 1952

—How the Auto Industry Turns to War Work

—A Chronology of Events in Metalworking During 1951

—A Calendar of Meetings and Conventions Scheduled for 1952

Who's Who In the Defense Organization

A four-page fold-out insert, which will tell who to contact in Washington.

Metalworking Facts and Figures

A 48-page section presenting an outstanding compilation of statistics covering every phase of metalproducing and metalworking. They cover production, distribution, shipments, prices of metals, machinery and equipment, transportation, appliances, business indexes, employment and wages, finance, fuel, power, raw materials and construction—all conveniently indexed in detail and attractively presented in charts and tables.

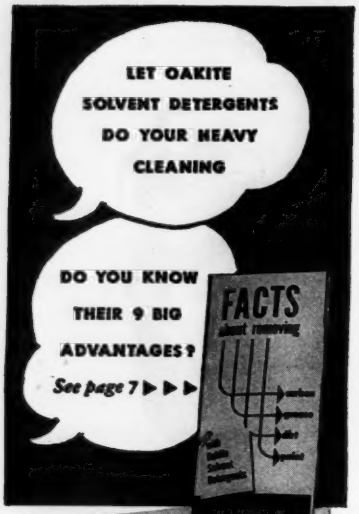
We are working to make the '52 YEARBOOK the best we have ever published. I hope you will watch for it on January 7.

Cordially yours,

Irwin H. Such

Editor, STEEL

P.S. If you are already a STEEL subscriber the 1952 METALWORKING YEARBOOK will come to you at no extra cost as part of your regular service. Additional copies may be ordered at $2.00 each.



This new FREE booklet on Solvent Detergents

TELLS HOW two new types of Oakite-developed cleaners make it easier and cheaper for you to do many difficult metal-cleaning jobs. Here are some of the subjects covered in the booklet:

- **Cleaning-action of solvent-detergents**
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- **Providing temporary protection against rust**
- **How to use Oakite solvent detergents:**
  - **Spray-washing machine method**
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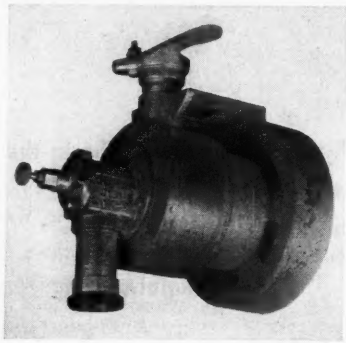
clutching and braking. Table tilt is accomplished through a 3 hp brake motor that affords instant stopping. Table tilts 135 degrees in 23.4 seconds; controls are 110 v ac. Clutches and brake are 90 v dc, at J.I.C. standards.

Explosion Gas-Oil Burner

USE REPLY CARD—CIRCLE No. 16

Substantially complete combustion (11½ per cent CO_2 Orsat) and low fuel consumption rates are attributed to an explosion type burner developed by RA-Diant Heat Refractories Inc., 1413 W. Tusk Ave., Canton, O. Burner offers versatility in heat ranges, smokeless burning of fuel, no carbon deposition and rapid recovery of temperature head. Action of liner composition, its porous structure and chemical constituents, instantly gasifies atomized fuel discharged into the burner tube to ease combustion.



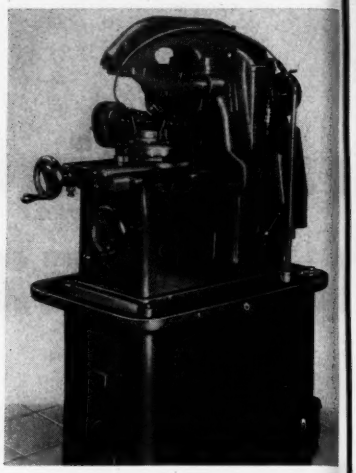
. . . offers smokeless burning of fuel

Burners light immediately without preheating because a charge of highly combustible gas is retained in porous structure of the line from previous usage. Unit features a constant air supply and regulates only the fuel. Proper mixture is gained by a secondary air inlet that in turn determines pulsation frequency and thereby controls heat output. Complete burner unit is portable, burns gas or oil with equal efficiency.

Gear Hobber Accuracy Improved

USE REPLY CARD—CIRCLE No. 17

Improvement in measuring and positioning accuracy in its No. 1 gear hobber is announced by Hamilton Tool Co., Hamilton, O. To cut costs by substantially reducing set-up time, a vernier that measures minutes of degrees on the turntable scale has been installed as standrd equipment. In addition, a knurled thumb wheel that provides accurate and rapid means of positioning the hob relative to the work-piece has been added. Other design features now include use of Ruthman pressure pumps for coolant circulation. Controls for the coolant system have been established independent from the machine's other working parts.



. . . has vernier measuring, hob positioning

Starter, Circuit Breaker

USE REPLY CARD—CIRCLE No. 18

A combination across-the-line motor starter with circuit breaker, in which components are mounted side-by-side, is available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Developed for use where this mounting is desired for reasons of space and arrangement, it has the same self-indicating slamproof handle as the standard design with vertical mounting. Handle has separate position for on, tripped, off, reset and open cover. Starter is available in sizes 0, 1 and 2 in sheet steel enclosures for NEMA I, IA and V.

Alkyd Resin Primer

USE REPLY CARD—CIRCLE No. 19

Designated as Glyptal 7422, an alkyd resin manufactured by General Electric's Chemical Division, Pittsfield, Mass., air dries dust free in 5 to 10 minutes and tack free in 3 to 4 hours. It is a short, pure, oil-modified alkyd, free of rosin, phenolic, styrene and other modifiers. Its features include color retention, adhesion, toughness, mar resistance and salt spray resistance.

Nonindicating Pressure Control

USE REPLY CARD—CIRCLE No. 20

A nonindicating pressure controller for regulating control valves is available from Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. Known as Honeywell Pressure Pilot,

it is for use on process systems in chemical, power and other industries where pressure control is essential. Features of the pilot include an accurate set-point adjustment.

Screwholding Screwdriver

USE REPLY CARD—CIRCLE No. 21

Hunter Tool Co., Los Angeles 23, Calif., has developed a screwholding screwdriver to drive small screws in tight, hard to get at places. To fasten the screw to the blade tip requires only a slight push against the screw slot. This action rotates a hardened steel locking pin in the center of the blade which firmly locks the blade tip in the screw slot.

Caterpillar Service Tools

USE REPLY CARD—CIRCLE No. 22

Set of caterpillar service tools for use with the company's Power-Twin hydraulic puller is offered by Owatonna Tool Co., Owatonna Minn. Set contains the minimum assortment of pullers, adapters and attachments tested and found necessary to service caterpillar tractors.

One-Piece Spray Gun

USE REPLY CARD—CIRCLE No. 23

One-piece aluminum forged spray gun is offered by Master Mfg. Co., Chicago 7. Gun has stainless air needle, nozzle, material needle and sleeve. Air cap-ring nut unit is also one piece in design and the entire tool is leak proof. Conversion is easy from siphon cup to pressure container use.

Vacuum Pressure Measure

USE REPLY CARD—CIRCLE No. 24

Automatic Temperature Control Co. Philadelphia 44, offers its Atcotran transmitter for measuring vacuum pressures with reference to an absolute pressure. The electro-mechanical instrument consists of two opposing bellows connected to a cantilever beam spring and a differential transformer. Transformer can provide alternating current output signal linear to within 1/10 of 1 per cent at 1/100-gram for armature displacement.

Nonfouling Spark Plug

USE REPLY CARD—CIRCLE No. 25

Spark plug made by Circ-O-Fire Spark Plug Co., Detroit, has a permanent gap setting that never requires re-gapping and eliminates need for frequent cleaning. Plug fires from a round center electrode to the metal shell that acts as a ground. Insulator is made of aluminum oxide, allowing faster heat flow. Heavy shell construction permits secure installation of plug without danger of distortion, assuring proper seating and dissipation of heat through insulator and shell to the cylinder head.

Flame Failure Safeguard

USE REPLY CARD—CIRCLE No. 26

Photoelectric flame failure safeguard, the Fireye, introduced by Combustion Control Corp., Cambridge, Mass., protects semi-automatic or manually-fired oil, gas and combination burners. When flame fails, the unit instantly cuts off fuel and can be wired to sound an alarm.

Alloy Welding Pipe

USE REPLY CARD—CIRCLE No. 27

Complete line of alloy welding pipe fittings, based on greater wall thickness throughout and added thickness in areas of stress, is announced by Key Co., E. St. Louis, Ill. Fittings are available in low and intermediate alloys and various types of stainless. Boss is provided on all fittings for tapped openings.

Inhibitor Is Quick Dryer

USE REPLY CARD—CIRCLE No. 28

Combination rust inhibitive primer and finish coat that dries in 10-15 minutes is offered by Wilbur & Williams Co., Boston 35, Mass. Applicable for either interior or exterior surfaces, its adhesion is said to be excellent over smooth aluminum or galvanized surfaces.

Cooling, Lubricating Agent

USE REPLY CARD—CIRCLE No. 29

Lubri-Cut, a cooling and lubricating agent, is announced by Tap & Drill E-Z Corp., Inglewood, Calif. It is fire-resistant, and is said to be free from all abrasives and acids. Composed of cooling and lubricating agents that cling to the tool, it is available in both paste and semipaste form.

Concrete Glazing Sealer

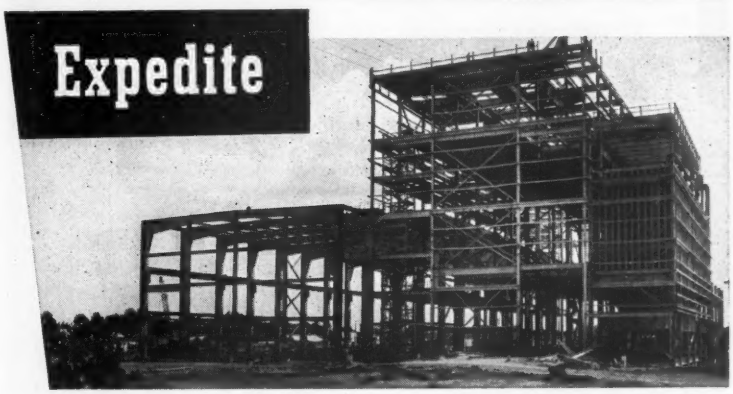
USE REPLY CARD—CIRCLE No. 30

Rex Home Supply Co., Ossining, N. Y., offers a concrete glazing sealer for use where a dust problem exists on plant or warehouse floors. Called Concrete Glaze, the fast-drying, clear varnish seals with a resinous coating that is unaffected by residual alkali in concrete. Its good footing characteristics prevent slippery effects under all conditions.

Circuit Breaker Redesigned

USE REPLY CARD—CIRCLE No. 31

Redesigned Magnette panelboard circuit breaker is announced by Heinemann Electric Co., Trenton 2,



Ingalls can expedite the construction of your power plant because steel is fabricated in one or more of its plants and delivered to the job by the shortest route from mill of origin ready to be built into the structure. Phone, wire or write us for assistance in expediting your power plant construction problems.

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In times of emergency, substitutes can often be used to good advantage.

Right now, the urgent requirements of production for national defense are taking the lion's share of high-grade alloying materials.

That is as it should be, of course. But the fact remains that many manufacturers are being confronted daily with knotty problems of production.

Frequently these difficulties can be solved by using substitute grades or alternate methods of manufacture and treatment.

To help you decide *which* substitute grades you can use and *how* you can use them most effectively, call on our staff of metallurgical experts.

A letter – or a phone call – will focus Wheelock, Lovejoy's specialized technical skill and long experience on your individual problems.

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Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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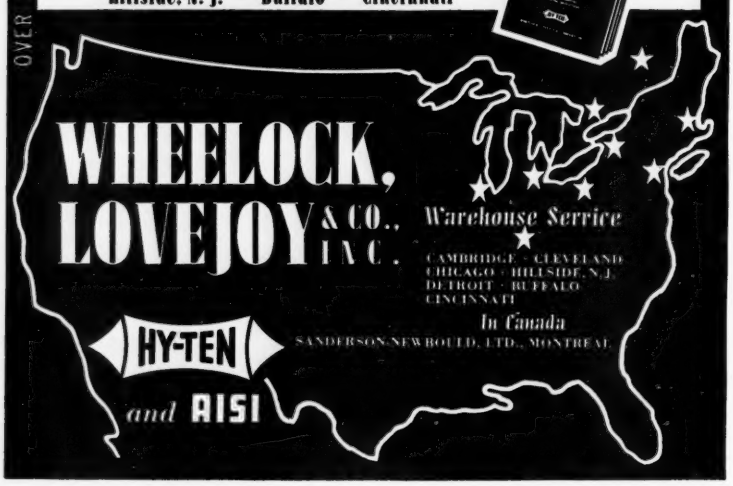


N. J., making it interchangeable with many other conventional circuit breakers. Unit is made more compact; employs the company's fully magnetic operating principle. Arc extinction is provided by a quenching well. Heat from any arc causes pressure in the well, which then quenches the arc.

Aluminum Hot Tank Cleaner

USE REPLY CARD—CIRCLE No. 32

Nonfoaming, noncorrosive, nonetching aluminum hot tank cleaner, called Aviation, is offered by Turco Products Inc., Los Angeles 54, Calif. Cleaner rinses quickly and has no tendency to leave powdery residue. Nonfoaming characteristic permits agitation to speed cleansing process. Product meets corrosion requirements of MIL-C-5543.

Combined Applicator-Abrasive

USE REPLY CARD—CIRCLE No. 33

Cotton polishing units impregnated throughout with any of a variety of polishing, buffing or oiling compounds are offered by Embree Mfg. Co., Elizabeth 4, N. J. Called Rollies, the units' design combines ingredients and application in one package. Cost of wiping-rags is eliminated.

Synthetic Wax Improved

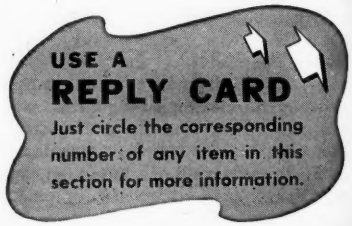
USE REPLY CARD—CIRCLE No. 34

Improvement of its Acrawax C in color stability toward heat is announced by Glyco Products Co. Inc., Brooklyn 2, N. Y. Tendency of the light tan, hard synthetic wax to darken when melted is minimized. Product is used for insulating, as a mold release agent, lubricant and to increase moisture and salt spray resistance.

Ultrasonic Soldering Iron

USE REPLY CARD—CIRCLE No. 35

Soldering iron, made for soft soldering aluminum and alloys for which rapid oxidation makes tinning by normal methods impractical, is offered by Eagle Engineering Co., Chicago 5, Ill. Unit consists essentially of a nickel bit surrounded by a low voltage heater winding and attached to a magnetostriction transducer. In technique used, hard oxide skin is



Helpful Literature

75. Sheet Storage System

Acme Tank & Welding Div., United Tool & Die Co.—How Acme sheet storage system has resulted in easier handling, space savings, manual handling reduction and damage protection is told in 12-page illustrated brochure. Steel, alloy and aluminum sheet is vertically stored and handled in steel and plywood 'books' made in sizes from 2 x 8 to 5 x 12 ft.

76. Seamless Tubing

Tube Reducing Corp.—"How to Cut Costs with Rockrite Close Tolerance Cold Reduced Seamless Tubing" is title and subject of 16-page illustrated bulletin R2. Close tolerances and smooth finish features are covered, along with specifications, shapes available and manufacturing techniques.

77. Vapor Collectors

Aget-Detroit Co.—Control of vapor, mist and fog in wet machining operations is covered in 4-page bulletin 622. Self-contained units which remove vapor laden air from machine, extract vapor and return cleaned air to working space are illustrated. Table lists ratings, dimensions and prices.

78. Portable Elevator

American Hoist & Derrick Co.—Improved features of portable material elevators which lead to fast erection, safe operation and low cost materials handling are outlined in 8-page illustrated catalog 250-E-1. Step-by-step procedures employed in erecting elevator towers at construction or maintenance site are explained.

79. Rotary Pump

Worthington Pump & Machinery Corp.—Illustrated and described in 4-page bulletin W-485-B1 are six models of heavy duty vane type rotary pumps in eight sizes. Pipe openings range from 2 to 12-in. suction and 2 to 10-in. discharge. Capacities from 25 to 1000 gpm and speeds from 850 to 210 rpm are covered.

80. Hydraulic Jacks

Templeton, Kenly and Co.—8-page folder "Hydraulic 51-R" contains photos, drawings, specifications and application data on hydraulic equipment in capacities from 10 to 100 tons. Simplex Re-Mo-Trol hydraulic pumps and rams are featured along with full listing of accessories and attachments.

81. Oil-Gas Burners

Cleaver-Brooks Co.—Hev-E gas and combination oil-gas burners for commercial and industrial use are subject of 4-page illustrated bulletin AD-101. Sizes of burners are available for boilers rated from 16 to 190 maximum boiler horsepower.

82. Inclinable Presses

Ferracute Machine Co.—Series C 30 streamlined inclinable presses available in sizes from 6 to 200 tons are subject of 6-page illustrated folder No. 31. Presses perform cutting, punching, stamping, shallow drawing and forming operations.

83. Expanded Metal

Penn Metal Co.—"How to make a little metal go a long way" is theme of 24-page catalog 493 EM which suggests many applications of expanded metal meshes. Emphasis is on savings of steel and critical metals while still allowing free passage of light and air, and on decorative effects.

84. Tube Cleaners

Elliott Co., Lagonda Div.—26-page illustrated bulletin Y-29 shows and describes representative types of cleaners, motors, cutter heads and accessories used to descale tubes and pipes. Covered are air, steam, water and electric driven cleaners for straight or curved tubes. Pipe and tube sizes are tabulated.

85. Spherical Metal Forming

Patushin Aviation Corp.—Company's process which effects high savings in time and cost in the spherical forming of jettisonable fuel tanks, practice bombs, skin cowling sections, tail cones and aft fuselage sections is described in 4-page illustrated folder "Forming Metal Faster —at Lower Cost."

86. Rotary Files & Burs

DoALL Co.—12-page illustrated brochure 51-812 features various types of rotary files; inside, outside and tube deburring cutters; ball seat reamers and threaded and taper shanks. Ground-from-the-solid rotary files and burs are available in high speed steel and carbide. Complete specifications are provided.

87. Annealing Furnaces

Drever Co.—Single and multiple strand continuous strip annealing furnaces are covered in 8-page illustrated bulletin B-61. General data on each type, specific applications, inherent advantages and actual production data are included.

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HELPFUL LITERATURE

88. Liquid Flow Meters

Brooks Rotameter Co.—Rotameters, ranging from Brooks-Mite for small flow indication of liquids and gases to high capacity, high pressure meters and versatile research and test kit models for industrial application are subject of illustrated bulletin 110.

89. Materials Handling

Clark Equipment Co., Industrial Truck Div.—Condensed 8-page illustrated catalog TC-53 contains model, capacities and specifications of gas and electric fork lift trucks as well as towing tractors, powered hand trucks, hand pallet trucks, hand platform trucks and hand stackers. Visual cross-reference tables facilitate selection of equipment.

90. Power Press Brakes

Columbia Machinery & Engineering Corp.—Power press brakes of 120 to 1000-ton capacities for forming mild steel from $\frac{1}{8}$ to 1-in. thick and 6 to 20 ft long are described in 8-page illustrated bulletin 107. Beading, bending, blanking, drawing, punching, forming, shearing and many other operations can be performed.

91. Overhead Handling

Cleveland Crane & Engineering Co., Cleveland Tramrail Div.—12-page illustrated engineering and application data manual 2008G deals with complete line of Tramrail overhead materials handling equipment. Information is included on track, hand and power trolleys and tractors, hand or electric carriers, cranes and transfer bridges, gantry cranes, buckets and grabs.

92. Spade & Core Drills

Conner Tool & Cutter Co.—52-page illustrated catalog and price list No. 51 shows both spade and core drills in stock sizes from $1\frac{1}{4}$-in. to 5-in. diameters in steps of $\frac{1}{4}$-in. Drills are interchangeable in eight sizes of holders, with and without oil holes, and made in various types for use on regular shop equipment.

93. Fasteners

Eaton Mfg. Co., Reliance Div.—Illustrations, dimensional data, specifications, applications and general information on Reliance retaining rings, Eaton Springtites, and Reliance spring lock washers are included in 20-page catalog 4k/3.

94. Sleeve Bearings & Bushings

Federal-Mogul Corp. — 16-page illustrated color brochure No. FME-562 describes company facilities as well as full line of sleeve bearings, cast bronze bushings, precision bronze parts, bimetal split bushings, rolled and split bushings, washers, spacer tubes and bronze bars.

95. Industrial Locomotives

Fate-Root-Heath Co., Plymouth Locomotive Works Div.—30-page catalog LG-52 on Plymouth locomotives includes photos and specifications for complete line of 3 to 70-ton industrial switchers. Operation and advantages of Hydraulic torque converter drive is described. Questionnaire insert aids in analyzing hauling needs and outlines method for figuring track grade percentages.

96. Tool Post Turret

Crozier Machine Tool Co.—Twelve-position indexing tool post turret and collet closing attachments for lathes are subject of 4-page illustrated folder. Price list and instructions for ordering are included.

97. Metal Hose & Bellows

Chicago Metal Hose Corp.—Two sections of 16-page illustrated bulletin CMH-123 are devoted to complete application data on Flexon metal bellows and flexible metal hose. Bellows are offered in stainless up to 2-in. ID and in brass and bronze to 2¾ in. Hose for liquid, gas, solid and semi-solid service is made in several constructions and sizes to suit application.

98. Plant Design Service

Continental Industrial Engineers, Inc.—12-page illustrated booklet No. 127 outlines manufacturing, engineering and construction services rendered by company in following fields: complete industrial plants; production lines and special automatic machines; and industrial furnaces, ovens and dryers. Short description of processes and equipment for performing them is included.

99. Wired Industrial Television

Diamond Power Specialty Corp.—16-page illustrated bulletin 1025 presents wide variety of applications for Utiliscope system of wired TV which "enables you to see where you can't look." Applications include safety, production, filing, mining, steelmaking, plant protection, nuclear research, inaccessible meter readings, etc. Description of equipment is included.

100. Air-Cushioned Vibrator

Cleveland Vibrator Co.—4-page illustrated bulletin "Bin Stuck Lately?" explains operation and advantages of air-cushioned vibrators for moving, settling or packaging bulk materials. These units operate on 40 to 80-psi air pressure and are available in 1 to 3-in. piston diameters.

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temporarily destroyed by passing ultrasonic energy through the molten solder. No flux is required to complete this operation.

Carbon Form Numbering Unit

USE REPLY CARD—CIRCLE No. 36

Wm. A. Force Co. Inc., New York 13, N. Y. offers a carbon print numbering machine that numbers accurately and legibly through many copies by use of heavy steel handle and deeply engraved Gothic figures. Adjustable gage locates number in any desired position on the form. Chrome plated platform assures ease and speed of operation.

Water Shedding Compound

USE REPLY CARD—CIRCLE No. 37

Water shedding compound, known as water displacing liquid No. 51, is added to the line of water shedding agents made by Enthone Inc., New Haven, Conn. Compound is a light liquid that displaces water film from metal surfaces, facilitating stain-free drying. Compound leaves a thin liquid film that acts as a moderate rust inhibitor.

Improved Paper Masking

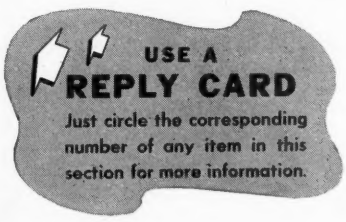
USE REPLY CARD—CIRCLE No. 38

Improved paper mask for production line spray or brush painting and sandblasting is offered by By-Buk Co., Los Angeles 19, Calif. Special grade of pressure-sensitive adhesive is impregnated on the back of the paint and lacquer resistant paper. Heat resistant paper for bake ovens is also available.

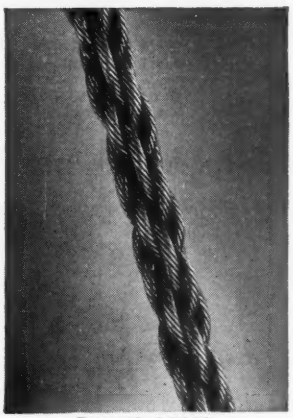
Low Pressure Relief Valve

USE REPLY CARD—CIRCLE No. 39

Andrews-Alderfer Co., Akron, O., offers Andal type C-13 relief valve for positive, accurate control of gasses and vapors at preset pressure range of 7-10 psi. Unit is recommended for use on rigid containers such as storage tanks and aircraft engine shipping enclosures. It is available in three models having ¼-inch, ⅜-inch or special type pipe thread.



Knot It! Kink It! ...IT WON'T HURT A Tuffy® SLING!



Patent No. 2,454,417

Get your FREE Tuffy 3-ft. sample sling and see for yourself how Tuffy's patented braided wire fabric makes an extra flexible sling. Tie it in knots, kink it, then see how easily it is straightened without damaging it in any way.

The reason is Tuffy's unique construction. (See enlarged photograph). Scores of wires are stranded into 9 parts, then machine woven into a wire fabric that has unusual flexibility and strength. Even cutting one of the 9 parts will not cause stranding.

11 Types of Tuffy Slings Available

There's a Tuffy Sling for *your* needs. If not, Union Wire Rope engineers will help work out special slings. Each one is proof-tested to twice its safe working load and the safe working load is stamped on metal tag attached to each sling. If you have your own rigging loft, Tuffy fabric is available by the reel.

MAIL COUPON FOR YOUR FREE SLING

See for yourself that all the things we claim for Tuffy Slings are true. A free 3-foot sample is yours for the asking. Just mail the coupon and your Union fieldman will deliver yours to you.

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Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman

The Market Outlook

APPROACH of yearend finds the steel markets highly disturbed by threat of an industry-wide strike Jan. 1 unless a wage settlement is achieved before that date. Chances for working out a formula satisfactory to union and management for settling the issue before the strike deadline are slight. The union and steel management at last week-end appeared miles apart in their thinking with union demands estimated to average around 35 to 40 cents per hour increase. Opposition by the government to price increases as an offset to a wage boost appeared to write off the possibility of settling the issue through straight collective bargaining. So solution of the problem appears to rest almost entirely with the government. A truce to delay the strike is, of course, possible.

DEMAND—Meanwhile, the steel mills continue under pressure for tonnage although demands from the consumer durable goods manufacturers are noticeably off. The slack is more than offset by expanding defense requirements. The mills are sold out on virtually all products for first quarter. Some Controlled Materials Plan tickets for the period are unfilled though government reports indicate much better balance between allotments and production has been achieved than was the case in the closing three months of 1951. Some seasonal slackening in pressure is indicated over the holidays, but prompt upturn in activity is expected at the turn of the year provided the mills are not strikebound.

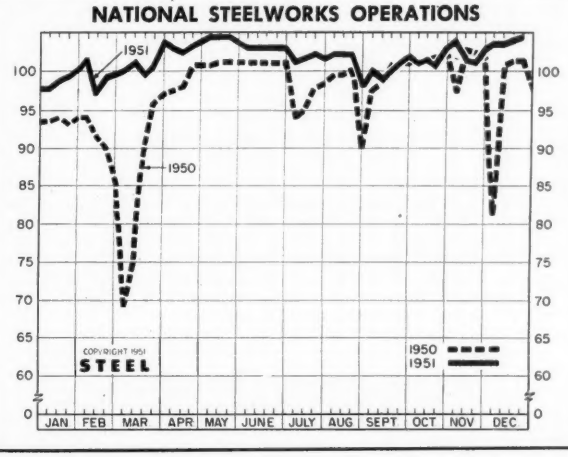
SHORTAGES—Severe shortages in many major products promise to extend well into 1952. In fact, all the signs indicate such items as pipe, plates, and alloy bars will be in short supply throughout the year. However, many products will be in progressively better tonnage as 1952 advances with considerable new steelmaking facilities scheduled for completion. Light, flat-rolled steel will be in noticeably increased supply by midyear. Easier structural steel situation is anticipated in the closing months of the year by which time much defense construction now in progress is expected to be completed.

ALLOTMENTS—Direct defense and related production and construction, beginning first quarter, will take more than 40 per cent of the carbon steel supply, and about 60 per cent of the supplies of aluminum and copper and brass mill products. These are estimates of the Defense Production Administration based on allotments for the period under the Controlled Materials Plan. The heavy take reflects the greatly increased defense order load on suppliers as the military program gets into full swing. It also explains the additional cutbacks in supplies on consumer durable goods account scheduled for the first three months of the year.

PRODUCTION—The steel mills added over 2,090,000 tons to their 1951 output last week, eclipsing the previous weekly high output rate of 2,089,000 tons established in the week ended Nov. 4. Output for the year is expected to top 105,145,000 net tons for a new all-time record. Last week the nation's furnaces operated at 104.5 per cent of capacity, up ½ point from the preceding week. This marks the 42nd week in 1951 in which the industry operated at 100 per cent of capacity or higher. A year ago production was at the rate of 1,944,000 net tons at this time. Operations are expected to fall off somewhat this week due to curtailments over the Christmas holiday.

PRICES—Undertone of the steel and related markets is firm at ceiling price levels. Current speculation with respect to the future price trend is confused. Tied in with the wage issue the outcome appears to hinge upon policy as determined by the government. Gossip in the trade has it the industry would require at least $6 to $7 per ton increase in prices in offsetting the wage demands of the union. STEEL's weighted index on finished steel is unchanged at 171.92 as is the arithmetical composite at $106.32. The pig iron composite is firm with No. 2 foundry, $52.54, basic, $52.16 and malleable, $53.27. The No. 1 heavy melting steel scrap composite is firm at $43.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Dec. 22	Change	Same Week 1950	Same Week 1949
Pittsburgh	101	+ 1*	102	96.5
Chicago	107	0*	99.5	98.5
Mid-Atlantic	101	— 0.5	98	85
Youngstown	106	0	105	98
Wheeling	103	+ 1	100.5	91
Cleveland	106.5	— 1.5*	102.5	92.5
Buffalo	104	0	104	103.5
Birmingham	105	0	100	100
New England	88	+11	85	85
Cincinnati	101	— 1	102	104
St. Louis	87	+ 5	95	84.5
Detroit	110	+ 2	102	106
Western	103.5	+ 5.5	105.5	90
Estimated national rate	104.5	+ 0.5	101.5	94.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 17 Production-Engineering News—p. 53

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Dec. 20 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)..	171.92	171.92	171.92	167.67	112.82
Index in cents per lb.	4.657	4.657	4.657	4.545	3.056
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$103.50	$64.91
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT ...	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	45.50	30.75

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

COMPARISON OF PRICES

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 20 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.96
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh ..	3.65	3.65	3.65	3.65	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.35
Shapes, del. Philadelphia ..	3.918	3.918	3.918	3.90	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.50
Plates, Chicago	3.70	3.70	3.70	3.70	2.50
Plates, Coatesville, Pa. ...	4.15	4.15	4.15	4.15	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.50
Sheets, H.R., Pittsburgh ..	3.60–75	3.60–75	3.60–75	3.60–75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh ..	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.335
Sheets, Galv., Pittsburgh ..	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.25	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.50-4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.335
Wire, Basic, Pittsburgh ...	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.05
Nails, Wire, Pittsburgh ...	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	3.75
Tin plate, box, Pittsburgh..	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$47.00
Wire rods, 7/32-9/16", Pitts. ..	4.10–30	4.10–30	4.10–30	4.10–30	2.55

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	31.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Del. Phila. ..	57.11	57.11	57.11	56.89	32.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	30.94
Malleable Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts. ..	$44.00	$44.00	$44.00	$46.50	$31.50
No. 1 Heavy Melt. E. Pa. ..	42.50	42.50	42.50	45.00	30.75
No. 1 Heavy Melt. Chicago.	42.50	42.50	42.50	45.00	30.00
No. 1 Heavy Melt. Valley..	44.00	44.00	44.00	46.25	32.50
No. 1 Heavy Melt. Cleve..	43.00	43.00	43.00	45.75	32.50
No. 1 Heavy Melt. Buffalo	43.00	43.00	43.00	49.88	29.00
Rails, Rerolling, Chicago ..	52.50	52.50	52.50	67.00	34.75
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	63.00	37.50

* F.o.b. shipping ponit.

COKE, Net Ton

Beehive, Furn. Connisvl. ..	$14.75	$14.75	$14.75	$14.75	$8.75
Beehive, Fdry., Connisvl...	17.50	17.50	17.50	17.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	12.35
Tin, New York	103.00	103.00	103.00	146.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ...	50.00	50.00	50.00	32.00	28.25
Nickel, refinery, duty paid.	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.00	57.50	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah, G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del. ...	60.16	60.66	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O. del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SIVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SIVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Dec. 20, 1951; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 .....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 .....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y., B2..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ...56.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 .66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 .....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 .....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14..70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 .....82.00
So.Duquesne,Pa. U5 ...82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton,Ill. L1 .....4.40
AlabamaCity,Ala. R2 ...4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 .....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ...4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand., Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.25
Lackawanna,N.Y. B2 ...3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 .....4.85
Phoenixville,Pa. P4 .....5.90
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14.3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ...3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ...5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ...5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ...6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 .....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ...4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ...4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif. (30) K1 .4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah G1 .....3.70
Harrisburg,Pa. C5 .....6.30
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ...3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14..3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1.3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ...3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ...4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ...3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 .....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12, R2.4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 ....4.55
Detroit P17 .....4.70
Donora,Pa. A 7.....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. L2, M13 .4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ...5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa. (3,4) F5 ..4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7 .5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 ...4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J. (Staybolt)U1 15.00
Dover, (Eng.Bolt) U1 ...13.50
Dover, (Wrgh.Iron) U1 ..12.25
Economy,Pa. (S.R.) B14 .9.60
Economy,Pa. (D.R.)B14 11.90
Economy, (Staybolt)B14 12.20
McK.Rks.(Staybolt) L5.14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ...3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.50
Monessen,Pa. P7 .....4.30
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85
Seattle B3 .....4.60
So.Chicago,Ill. U5 .....4.30
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ...4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ...4.75
Williamsport,Pa. S19 ....5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ...4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah G1 .....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1..3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ...3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.85
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ...5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint (36) B2..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 8 lb

Yorkville,O. W10	8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10)	S15 5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base.	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

Midland,Pa. C18	5.85
NewBritn,Conn.(10)	S15 5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10)	S15 5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frtez-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Josiyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa.	S18 ....10.60
Cleveland	A7 .....10.00
Dover, O.	G6 .....10.50
Fontana,Calif.	K1 ...11.65
Harrison,N.J.	C18 ....10.60
Midland,Pa.	..C18 ....10.60
NewBritn,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8.10.75
Pawtucket,R.I.(12)	N8.11.05
Sharon,Pa.	S3 .....10.60
Worcester,Mass.	A7 ..10.30
Youngstown	C8 ..... 10.60

STRIP, Hot-Rolled Ingot Iron

Asland,Ky. (8)	A10 ..3.75
Warren,O.	R2 .....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 .....5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 .....4.05
Riverdale,Ill.	A1 .....3.90
Sharon,Pa.	S3 .....4.15
Youngstown	U5 .....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2. 5.70	5.95
Aliquippa	J5 ... 5.70	6.15
Atlanta	A11 .... 5.95	6.40
Bartonville(19)	K4 5.70	6.15
Buffalo	W12 .... 4.85	...
Cleveland	A7 .... 5.70	6.15
Crawfordsville	M8 5.95	6.40
Donora,Pa.	A7 .. 5.70	6.15
Duluth,Minn.	A7. 5.70	6.15
Fairfield	T2 .... 5.70	6.15
Houston,Tex.	S5 . 6.10	6.55
Johnstown	B2 .. 5.70	6.15
Joliet,Ill.	A7 ....5.70	6.15
KansasCy,Mo.	S5. 6.30	6.75
Kokomo	C16 .... 5.80	6.05
LosAngeles	B3 .. 6.65	...
Minnequa	C10 ... 5.95	4.45
Monessen,Pa.	P7 .... 5.95	6.40
Palmer	W12 .... 5.15	...
Pitts.,Calif.	C11. 6.65	6.80
Prtsmth.	(18)P12 . 6.10	6.60
Rankin	A7 ..... 5.70	6.15
So.Chicago	R2 .. 5.70	5.95
So.S.Fran.	C10 .. 6.65	7.10
SparrowsPt.	B2 .. 5.80	6.25
Sterling,Ill.	(1)N15 5.70	6.15
Struthers,O.	Y1 . 5.70	6.15
Torrance,Cal.	C11 6.65	...
Worcester	A7 ... 6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill.	L1 ... 8.65	8.90
Bartonville,Ill.	K4 8.55	8.80
Buffalo	W12 ....8.55	8.80
Fostoria,O.	S1 .. 8.85	9.10
Johnstown,Pa.	B2 8.55	8.80
Monessen,Pa.	P16 8.55	8.80
Monessen,Pa.	P7. 8.80	9.05
Palmer,Mass.	W12 8.85	9.10
Portsmouth,O.	P12 8.55	8.80
Roebling,N.J.	R5. 8.85	9.10
SparrowsPt.	B2.. 8.65	8.90
Struthers,O.	Y1.. 8.55	8.80
Worcester	J4, T6. 8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2...4.85
Aliquippa,Pa.	J5 .....4.85
Atlanta	A11 .....5.10
Alton,Ill.	L1 .....5.05
Bartonville,Ill.(1)	K4 ..4.85
Buffalo	W12 .....4.85
Chicago	W13 .....5.10
Cleveland	A7, C20 ....4.85
Crawfordsville,Ind.	M8 .5.10
Donora,Pa.	A7 .....4.85
Duluth,Minn.	A7 .....4.85
Fairfield,Ala.	T2 .....4.85
Fostoria,O.(24)	S1 ....5.35
Houston	S5 .....5.25
Johnstown,Pa.	B2 .....4.85
Joliet,Ill.	A7 .....4.85
KansasCity,Mo.	S5 ....5.45
Kokomo,Ind.	C16 .....4.95
LosAngeles	B3 .....5.80
Minnequa,Colo.	C10 ....5.10
Monessen,Pa.	P7 .....5.10
Newark, 6-8 ga.	I-1 ..5.50
No.Tonawanda	B11 ....4.85
Palmer,Mass.	W12 ....5.15
Pittsburg,Calif.	C11 ....5.80
Portsmouth,O.	P12 ....5.25
Rankin,Pa.	A7 .....4.85
So.Chicago,Ill.	R2 .....4.85
So.SanFrancisco	C10....5.80
SparrowsPoint,Md.	B2..4.95
Sterling,Ill.(1)	N15 ....4.85
Struthers,O.	Y1 .....4.85
Torrance,Calif.	C11 ....5.80
Waukegan,Ill.	A7 .....4.85
Worcester,Mass.	A7, T6.5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 .....6.20
Buffalo	W12 .....6.35
Cleveland	A7 .....5.85
Crawfordsville,Ind.	M8..6.20
Detroit	D2 .....6.20
Dover,O.	G6 .....6.20
Fostoria,O.	S1 .....6.00
Kokomo,Ind.	C16 .....5.70
FranklinPark,Ill.	T6 ..6.20
Massillon,O.	R8 .....5.85
Monessen,Pa.	P16 .....5.85
Monessen,Pa.	P7 .....6.10
NewHaven,Conn.	D2 ...6.50
Pawtucket,R.I.(12)	N8..6.85
Trenton,N.J.	R5 .....6.15
Worcester,Mass.	A7 ....6.15
Worcester,Mass.	T6 ....6.50
Worcester,Mass.	W12 ...6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 .....8.50
Monessen,Pa.	P16 .....8.50
Roebling,N.J.	R5 .....8.80
SparrowsPoint,Md.	B2 .8.60
Johnstown,Pa.	B2 .....8.50

WIRE, Tire Bead

Bartonville,Ill.(1)	K4..10.90
Monessen,Pa.	P16 ....11.40
Roebling,N.J.	R5 .....11.55

WIRE (16 gage)

	An'ld	Galv. Stone
Aliquippa	J5 ....10.15	12.15
Bartonville(1)	K4 10.25	11.95
Cleveland	A7 ...10.25	12.15
Crawfrdsville	M8.10.30	12.00
Fostoria,O.	S1 ..10.40	13.00
Johnstown	B2 ...10.25	12.15
Kokomo	C16 ....10.25	11.95
Minnequa	C10 ...10.40	12.40
Palmer,Mass.	W12.10.25	12.15
Pitts.Cal.	C11 ...10.60	12.50
Prtsmth.	(18) P12.10.55	12.30
SparrowsPt.	B2. .10.35	12.25
Waukegan	A7 ..10.25	12.15

WIRE, MB Spring High Carbon

Aliquippa,Pa.	J5 .....6.25
Alton,Ill.	L1 .....6.45
Bartonville,Ill(1)	K4 ..6.25
Buffalo	W12 .....6.25
Cleveland	A7 .....6.25
Donora,Pa.	A7 .....6.25
Duluth,Minn.	A7 .....6.25
Fostoria,O.	S1 .....6.25
Johnstown,Pa.	B2 .....6.25
LosAngeles	B3 .....7.20
Milbury,Mass.(12)	N6 .8.05
Monessen,Pa.	P7, P16 .6.25
Palmer,Mass.	W12 ....6.55
Pittsburg,Calif.	C11 ...7.20
Roebling,N.J.	R5 .....6.55
Portsmouth,O.	P12 ....6.25
So.Chicago,Ill.	R2 .....6.25
So.SanFrancisco	C10 ...7.20
SparrowsPoint,Md.	B2 .6.35
Struthers,O.	Y1 .....6.25
Trenton,N.J.	A7 .....6.55
Waukegan,Ill.	A7 .....6.25
Worcester	A7, T6, W12.6.55
Worcester,Mass.	J4 ....6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1)	K4 ..8.90
Buffalo	W12 .....8.90
Chicago	W13 .....8.90
Cleveland	A7 .....8.90
Crawfordsville,Ind.	M8..8.95
Fostoria,O.	S1 .....8.90
Johnstown,Pa.	B2 .....8.90
Kokomo,Ind.	C16 .....8.90
Monessen,Pa.	P16 .....8.90
Palmer,Mass.	W12 .....9.20
Portsmouth,O.	P12 ....8.90
Roebling,N.J.	R5 .....9.20
Waukegan,Ill.	A7 .....8.90
Worcester,Mass.	A7 T6.9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala.	R2 ...137
Aliquippa,Pa.	J5 141
Atlanta	A11 144
Bartonville,Ill.	(19) K4 ..144
Crawfordsville,Ind.	M8 ..146
Donora,Pa.	A7 141
Duluth,Minn.	A7 141
Fairfield,Ala.	T2 141
Houston,Tex.	S5 149
Johnstown,Pa.	B2 141
Joliet,Ill.	A7 141
KansasCity,Mo.	S5 153
Kokomo,Ind.	C16 143
Minnequa,Colo.	C10 147
Monessen,Pa.	P7 146
Pittsburg,Calif.	C11 161
Portsmouth,O.	(18) P12 ..148
Rankin,Pa.	A7 141
So.Chicago,Ill.	R2 137
So.SanFran.,Calif.	C10 ..161
SparrowsPoint,Md.	B2 ..143
Sterling,Ill.(1)	N15 141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala.	R2 ..123
Atlanta	A11 126
Bartonville,Ill.(19)	K4 ..123
Crawfordsville,Ind.	M8 ..132
Donora,Pa.	A7 123
Duluth,Minn.	A7 123
Fairfield,Ala.	T2 123
Joliet,Ill.	A7 123
KansasCity,Mo.	S5 135
Kokomo,Ind	C16 125
Minnequa,Colo.	C10 128
Pittsburg,Calif.	C11 147
So. Chicago,Ill	R2 123
So.SanFran.,Calif.	C10 ..147
SparrowsPoint,Md.	B2 ..125
Sterling,Ill.(1)	N15 123

WIRE, Upholstery Spring

Aliquippa,Pa.	J5 .....5.90
Alton,Ill.	L1 .....6.10
Buffalo	W12 .....5.90
Cleveland	A7 .....5.90
Donora,Pa.	A7 .....5.90
Duluth,Minn.	A7 .....5.90
Johnstown,Pa.	B2 .....5.90
LosAngeles	B3 .....6.85
Monessen,Pa.	P7, P16 .5.90
NewHaven,Conn.	A7 ..6.20
Palmer,Mass.	W12 ....6.20
Pittsburg,Calif.	C11 ...6.85
Portsmouth,O.	P12 ....5.90
Roebling,N.J.	R5 .....6.20
So.Chicago,Ill.	R2 .....5.90
So.SanFrancisco	C10 ..6.85
SparrowsPoint,Md.	B2..6.00
Torrance,Calif.	C11 ...6.85
Trenton,N.J.	A7 .....6.20
Waukegan,Ill.	A7 .....5.90
Worcester,Mass.	A7 ....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala.	R2 ..127
Ala.City,Ala.	17-18ga.R2 214
Aliquippa,Pa.	9-14½ga.J5 131
Atlanta	A11 134
Bartonville,Ill.	(19) K4 ..131
Crawfordsville,Ind.	M8 ..133
Donora,Pa.	A7 131
Duluth,Minn.	A7 131
Fairfield,Ala.	T2 131
Houston,Tex.	S5 139
Johnstown,Pa.	B2 131
Johnstown,17ga.,	6" B2 ..205
Johnstown,17ga.,	4" B2 ..208
Joliet,Ill.	A7 131
KansasCity,Mo.	S5 143
Kokomo,Ind.	C16 133
Minnequa,Colo.	C10 139
Monessen,Pa.	P7 136
Pittsburg,Calif.	C11 154
Portsmouth,O.	(18) P12 .138
Rankin,Pa.	A7 131
So.Chicago,Ill.	R2 127
Sterling,Ill.	(1) N15 131

FENCE POSTS

ChicagoHts.,Ill.	C2 ...140
Duluth,Minn.	A7 125
Franklin,Pa.	F5 140
Huntington,W.Va.	W7 ..140
Johnstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago,Ill.	R2 140
Tonawanda,N.Y.	B12 ..140
Williamsport,Pa.	S19 ...150

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 ....9.85
Lebanon,Pa.(31)	B2 ...9.85
Minnequa,Colo.	C10 ..9.85
Pittsburgh	OS, P14 ..9.85
Seattle	B3 .....10.35

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa.	U5	3.60	3.50	3.55	4.00
Ensley,Ala.	T2	3.60	3.50	...	4.00
Fairfield,Ala.	T2	...	...	...	4.00
Gary,Ind.	U5	3.60	3.50	3.55	...
Huntington,W.Va.	W7 ..	...	...	...	5.00
Ind.Harbor,Ind.	I-2	3.60	3.50	3.55	...
Johnstown,Pa.	B2	...	...	...(16)	4.00
Lackawanna,N.Y.	B2	3.60	3.50	...	4.00
Minnequa,Colo.	C10	3.60	3.50	...	4.50
Steelton,Pa.	B2	3.60	3.50	...	...
Williamsport,Pa.	S19 ...	...	...	...	4.75

NAILS & STAPLES, Stock

To dealers & mfgrs. (7)	Col.
AlabamaCity,Ala.	R2 ..118
Aliquippa,Pa.(13)	J5 ..118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 ..118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	M8 .122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 126
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 130
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 124
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 ..120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa.	A3 .$7.35
Wheeling,W.Va.	W10 ..7.35

TIE PLATES

Fairfield,Ala.	T2 .....4.50
Gary,Ind.	U5 .....4.50
Ind.Harbor,Ind.	I-2 ..4.50
Lackawanna,N.Y.	B2 ..4.50
Minnequa,Colo.	C10 ....4.50
Pittsburg,Calif.	C11 ....4.65
Seattle	B3 .....4.65
Steelton,Pa.	B2 .....4.50
Torrance,Calif.	C11 ....4.65

JOINT BARS

Bessemer,Pa.	U5 .....4.70
Fairfield,Ala.	T2 .....4.70
Ind.Harbor,Ind.	I-2 ....4.70
Joliet,Ill.	U5 .....4.70
Lackawanna,N.Y.	B2 ..4.70
Minnequa,Colo.	C10 ....4.70
Steelton,Pa.	B2 .....4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1.6.15
KansasCity,Mo.	S5 ....6.40
Lebanon,Pa.	B2 .....6.15
Minnequa,Colo.	C10 ....6.15
Pittsburgh	J5 .....6.15
Seattle	B3 .....6.65
So.Chicago,Ill.	R2 ....6.15
Struthers,O.	Y1 .....6.15
Youngstown	R2 .....6.15

AXLES

Ind.Harbor,Ind.	S13 ....5.60
Johnstown,Pa.	B2 ....5.60

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Anaylsis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, and V3.

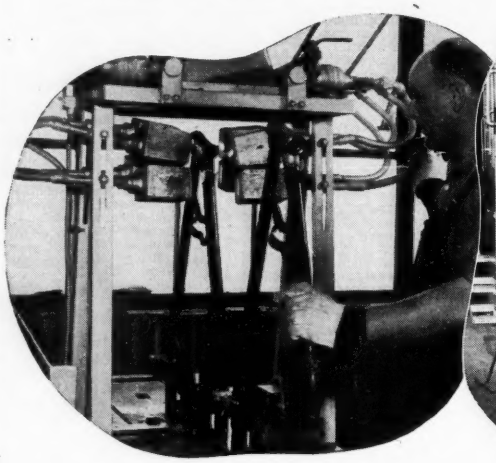
Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edgs.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

GAS is the VERSATILE FUEL
AT HARLEY-DAVIDSON MOTOR COMPANY

for SIMPLE BRAZING

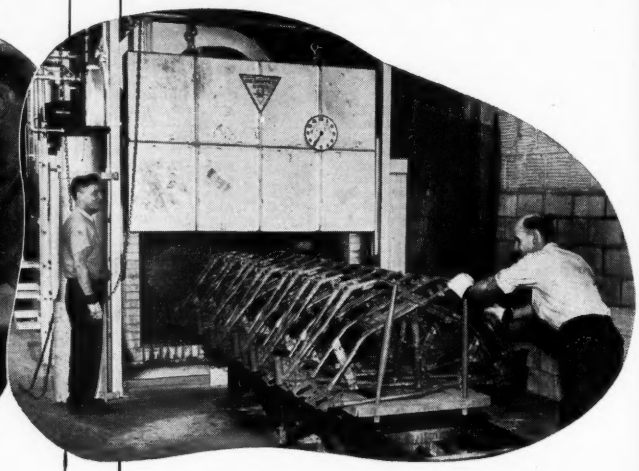
Simple, direct-flame Gas equipment, consisting of Furkert Gas air mixer, four Block burners, two-position fixture and automatic timer, silver brazes steering heads to Harley-Davidson motorcycle frames at a 34 per hr rate.



VERSATILE GAS makes an easy job of silver brazing. The simple Gas equipment provides scale-free work, steps up production, assures uniformity. The GAS flame is automatically timed to give a brazing cycle of 1¾ minutes, a 34 per hr rate.

or COMPLEX STRESS-RELIEVING

Motorcycle frames are charged into Gas-fired Despatch stress-relieving furnace. Cycle varies from ½ to 2 hr; automatically controlled temperatures range from 350° to 1200° F, depending on parts being stress-relieved.



VERSATILE GAS makes a multi-duty stress-relieving furnace of the GAS oven at Harley-Davidson. Size: 16′ long, 10′ wide, 12½′ high. Used to stress-relieve frames, safety bars, cams, forks, etc. Range: 350° to 1200° F. Cycle: ½ to 2 hr.

GAS is the Production-Line Fuel. Gas is versatile and temperatures can be controlled automatically and precisely; Gas is adaptable to simple direct-flame processes or complex heat-treating furnaces. Find out how GAS will work for you—call your Gas Company Representative, today.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	44.0	41.0	20.5	22.5	19.5
1½	27.5	2.78	42.5	41.5	41.5	21.5	20.0	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½ % on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ½", 1½ points lower on ¾", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜", Wheatland, Pa. W9, 2 points lower on ⅛", ⅜", ⅝"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼ % on 3½" and 4"; Youngstown Y1: Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4" Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½ % on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1⅝	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10%	Both Sides	—Sheets— Carbon Base 10%	20%	Cu Base Both Sides
302 ...	....	....	....	....	19.75	26.24–27.50	77.00
304 ...	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309 ...	30.50	35.00	....	....	....	....	....
310 ...	36.50	41.00	....	....	....	....	144.00
316 ...	29.50	34.00	....	....	26.00	35.92–36.50	....
317 ...	34.50	39.00	....	....	....	....	....
318 ...	33.50	38.00	....	....	....	....	....
321 ...	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347 ...	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405 ...	21.25	27.75	....	....	....	....	....
410 ...	20.75	27.25	....	....	....	....	....
Nickel.	33.55	45.15	41.00	54.00	....	....	....
Inconel.	41.23	54.18	....	....	....	....	165.00
Monel .	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
⅛-in. & smaller		35
¼-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

7/16-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches— Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Balt., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg...26.00-33.00

Industrial xylol .25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia..$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron 98+% Fe, carlots..	17.00
Swedish, c.i.f. New York, in bags..8.85-9.95	
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns ..83.00-148.00	
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots.	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of.. metal)	8.50
Stainless Steel, 302 ..	83.00
Zinc, 10-ton lots..23.00-30.50	

Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over ..	6.00
Less than 1000 lb ..	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over ...	4.15
Less than 1000 lb ..	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll, fur.	$14.50-15.00
Connelsvll, fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

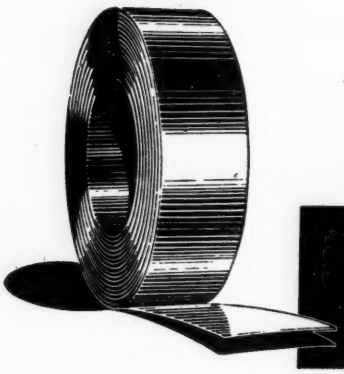
Kearny, N. J. ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
NevilleIsland, Pa., ovens	23.00
Swedeland, Pa., ovens.	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens.	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

SCRAP ~~Gold~~ is where you find it!

all it takes is a little DIGGING
... so DIG, brothers, DIG!

Dig out that plant scrap from every nook and cranny—turn in your production scrap on regular, frequent schedules— and you'll feel good because you're *doing good* for the entire metal industry!



Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras. Prices listed were in effect prior to Dec. 16 on which date CPR 98 became effective. Revised schedules will appear in following issues.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York (c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††‡	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††‡	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.23
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwau. (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans City (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90[3]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75[3]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[3]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85[3]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma	6.65	7.80[4]	8.90[3]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
San Francisco	7.05	8.60[3]	9.20[3]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr. c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%,) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr. C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 163, Dec. 10 issue; manganese, titanium and "other" ferroalloys, page 155, Dec. 17. Refractories prices were published on page 163, Dec. 10.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max, 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.ob. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered, Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1"x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%). 10,000 lb W or more, $5.00 per lb of contained W; 20,000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

*Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Dec. 20	$43.00
Dec. 13	43.00
Nov. 1951	43.00
Dec. 1950	45.50
Dec. 1946	27.69

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turning	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 3.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only upon OPS authorization or when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.
(6) Prices for Grade 30 may be charged only when sold upon OPS authorization to a gray iron foundry: otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches.	Base
10. Flues, Tubes & Pipes.	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under.	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shiping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes.	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery.	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be celing price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (Including Chester, Pa), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sporrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, 70c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Boring, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory: Prep'd	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

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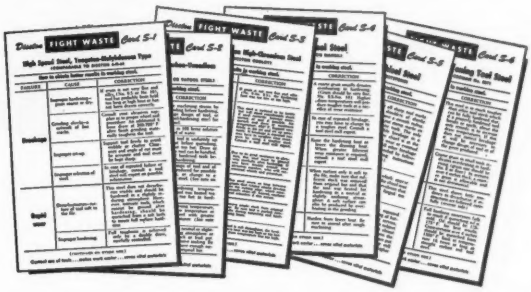

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(Comparable to DISSTON Croloy)

No. S-4 OIL-HARDENING TOOL STEEL
(Comparable to DISSTON Mansil)

No. S-5 CHROME-TUNGSTEN CHISEL STEEL
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The Metal Market

Nickel production rises 10 per cent in 1951 as the industry expands facilities to meet free world's essential needs. By 1954, capacity will be 30 per cent greater than pre-Korean

NICKEL production in the free world will approximate 295 million pounds in 1951, an increase of more than 10 per cent over 1950. Canadian producers accounted for 275 million pounds, or more than 90 per cent of the total this year. In 1950, Canada produced 247 million pounds of nickel in all forms. These statistics were included in a review of the industry by Dr. John F. Thompson, chairman and president, International Nickel Co. of Canada Ltd.

Reliable estimates of nickel production in Soviet Russia and satellite countries are not available, but the free world's total probably is several times greater than that behind the Iron Curtain.

"Measures to maintain this superiority in nickel supply were taken during the year by established nickel producers as well as new potential producers, in a number of instances with government co-operation," Dr. Thompson said. "These efforts will assure continuance of the amounts now available and are expected also by 1954 to provide an increase of about 30 per cent over that available before the Korean conflict."

Industry Expands — Falconbridge Nickel Mines Ltd., Canada's second largest producer, has embarked on a three-year expansion program which will increase maximum production to a rate of 40 million pounds of nickel annually. Prior to this expansion, Falconbridge's annual output was about 25 million pounds.

Plans of Sherritt Gordon Mines Ltd. call for inital production by the end of 1953 and maximum annual production of 17 million pounds in 1955.

In July, 1951, International Nickel announced it had achieved an increase of its nickel production by 12 million pounds annually, well ahead of schedule, through the installation of emergency facilities which brought the company's current rate of production to 252 million pounds annually.

The United States government is reopening its Nicaro nickel plant in Cuba with an annual capacity of 30 million pounds. Initial production at this plant is expected some time in 1952.

National Lead Co. expects to start operation in the first half of 1953 of a new cobalt, nickel and copper separation plant at Fredericktown, Mo. This is expected to add a total of nearly 9.3 million pounds of nickel to the company's production over the next five years.

Increased output is expected in 1952 from the nickel mines in New Caledonia, in the South Pacific. Operated by the french firm, S. A. Le-Nickel, the mines expect to produce more nickel in 1952 than the estimated production of 13 million to 14 million pounds for 1951. The mines and plants currently are being modernized and further developed.

In addition to the increased production already foreseeable, wide exploration and prospecting for new nickel deposits are in process by International Nickel and others in Canada, Africa and elsewhere.

Premium Price Plan Revived

Defense Materials Procurement Agency is negotiating over-the-ceiling agreements with operators of nine copper mines whose annual output is about 16,000 tons. The present ceiling price on copper is 24.50c a pound.

Louis S. Cates, chairman, Phelps Dodge Corp., estimates total production from all domestic mines at about 950,000 tons of copper. Refined copper output from scrap treated at primary plants this year is estimated at about 55,000 tons, or only half the tonnage turned out from this source in 1950. "On the basis of present figures," he said, "domestic consumption of copper for 1951 will be about 1.4 million tons."

Stocks of refined copper at the end of November totaled only 68,160 tons compared with 78,192 tons at the end of October. Deliveries to fabricators dropped to 123,746 tons from 125,286 tons while production of refined copper eased to 103,614 tons from 104,148 tons in October, reports the Copper Institute. Production of crude copper declined to 80,938 tons from primary sources and to 1975 tons from secondary sources.

Civilian Use of Metals Cut

Direct defense and defense-related production and construction will take about 60 per cent of the supplies of aluminum and copper wire mill and copper brass mill products, beginning in the first quarter of 1952.

Defense Production Administration does not have a supply estimate for copper brass mill products. However, 58.1 per cent of the CMP allotments are for direct defense and defense-related production and construction; 41.9 per cent for all other production and construction. Of total allotments, 331,876,000 pounds are for direct defense and 117,618,000 pounds for defense-related production.

Supply of copper wire mill products is estimated at 360 million pounds. Of the CMP allotments, 56.8 per cent are for direct defense and defense-related production; 43.2 per cent for all other production and construction. Of the total allotments, 103,822,000 pounds are for direct defense and 122,103,000 pounds for defense-related production.

Supply of copper foundry products is estimated at 290 million pounds. Of the CMP allotments, 41.8 per cent are for defense and defense-related production and construction; 58.2 per cent for all other production and construction. Of total allotments, 68,919,000 pounds are for direct defense, including 20 million pounds for the Department of Defense, and 65,674,000 pounds for defense-related production.

Aluminum supply for the first quarter is estimated at 620 million pounds. Of the CMP allotments, 59.8 per cent are for defense and defense-related production; 40.2 per cent for all other production and construction. Direct defense allotments amount to 322,039,000 pounds, including 250 million pounds for the Defense Department, and 104,921,000 pounds for defense-related production.

Acute Tin Shortage Forecast

An acute shortage of tin is expected to develop in the first quarter. The supply situation is aggravated by mounting requirements of the defense program and by the fact that very little tin has been imported since March, 1951.

In view of the critical tin supply, officials of National Production Authority urge industry to explore every means of conserving available supplies of this metal. Stressing that tin supplies available for distribution to industry are at an all-time low, NPA also noted that current estimates show that only 2100 tons of new tin supplies per month will be available to industry during the first quarter of 1952 against a normal consumption of 5200 tons to 5500 tons monthly.

Representatives of the tin consuming industry recommend a change in certain Navy specifications to permit greater use of silicon bronze, as well as to increasing use of lead-base babbitt to replace tin-base babbitt in certain industrial applications. They also pointed out that consumption of tin has been reduced to a virtual minimum, and that it is doubtful whether any further tightening of the use limitations of tin order M-18 would accomplish any appreciable conservation of this material.

NPA Rules on Aluminum Scrap

National Production Authority took action to limit the flow of aluminum scrap to primary producers during the first quarter and to assure a flow of this material to producers, smelters, reclaimers and fabricators whose inventories are precariously short.

By issuing a directive on aluminum scrap, NPA limits the amount of tolled and purchased scrap and secondary ingot which primary producers may receive during the quarter, basing receipts on the historical use of aluminum scrap in the industry. The primary aluminum producers affected by the directive are further restricted to 40 per cent of their aluminum scrap and secondary ingot receipts in any one month during the first quarter of 1952.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$218 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor-bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95%, 41.30; 90% 40.82; red brass 85%, 39.83; 80%, 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85%, 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95%, 41.90; 90%, 41.42; red brass, 85%, 40.43; 80%, 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R-317-T4	——Hexagonal—— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 1-20	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 21-30	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 1-20	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval, 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

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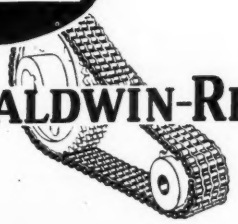

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Sheets, Strip . . .

Sheet and Strip Prices, Page 89 & 90

Philadelphia — Easing in carbon sheets is retarded by heavier directives on flat-rolled capacity for production of light plates. Demand has slackened for consumer durable goods, but effect is partly nullified by lower sheet-strip rolling capacity. Silicon straight chromium stainless and enameling sheets are in better supply but in some cases buyers lack CMP tickets. Allotments of galvanized have been reduced to approximately 25 per cent of quotas to distributors. Carbon sheet books will be opened for second quarter within a week.

Boston—Not enough authorized tickets are held for purchase of all straight chromium stainless grades offered, although little is available in nickel alloys. Costume jewelry consumers would take considerable more straight chromium stainless tonnage if they held authorizations. There is an easing in overall flat-rolled demand, including cold-rolled carbon sheets due in part to cutbacks in automotive tonnage. An exception is galvanized where production is limited by zinc.

New York—Most sheet producers are not opening books for second quarter until early January and expect capacity for that month to be well filled with high priority tonnage. For April books will be opened around Feb. 1 with lead-time scheduled in that sequence for the balance of second quarter. Of flat-rolled products galvanized is tightest, but some mills will not have available the cold-rolled sheet volume expected in view of automotive cutbacks.

Pittsburgh—Demand here continues strongest for hot-rolled material. Cold-rolled while still strong has eased somewhat during the last few weeks as a result of government cutbacks in many consumer durable goods. Producers would like to see stainless material removed from the list of CMP controlled materials. Many say there is no good reason why the product should be controlled at this time. Silicon sheets and long ternes continue in lessened demand.

Cleveland—Holiday influences will serve to slow down demand for sheets and strip over the next couple weeks. Cutbacks in allotments to civilian durable goods manufacturers, such as automobile builders and appliance makers, have definitely eased pressure on suppliers from that area of consumption. The slackening is most noticeable in cold-rolled and silicon sheets. Demand for hot-rolled sheets and strip continues strong, and galvanized sheets are in extremely short supply. Despite the easier pressure, the mills are sold out for first quarter. Most sellers will not open books for second quarter until the first of the new year.

Cincinnati—Curtailment of civilian durable goods production is evident in inquiries to sheet mills for second quarter tonnage. The trend toward heavier tonnage for highly rated defense needs continues unchecked, and pressure for light plates, being produced on maximum schedules, is growing.

St. Louis—Sheet demand is holding up unexpectedly well in this region of diversified consumer goods production. One mill for example recently canvassed orders for the first two quarters expecting to get 10 per cent cancellations. Actual cancellations were nearer 1 per cent. Mills have opened second quarter books on sheets. Carryover at year-end will average 2½ to 3 weeks.

Structural Shapes . . .

Structural Shape Prices, Page 89

New York—Structural fabricating shops have been forced to turn back some validated tickets for first quarter due to lack of plain material allotments to meet potential operating schedules. Shape tonnage authorized beyond requirements for specific projects is small and holding down shop inventories.

In connection with industrial plant construction, notably steel and other heavy products, heavier tonnage has been accompanied by a sharp increase in demand for structurals entering into equipment.

Nearly 300 traveling cranes of 10 to 425 tons capacity are required for steel mill expansion. Crane manufacturers received large orders over a short period of time and engineering of specially designed units is a bottleneck, plus difficulty in obtaining steel and component parts. Schedules previously established for deliveries of steel mill cranes up to July 1, 1952 have been frozen, but beyond that period problems involving possible rescheduling of deliveries are under consideration.

Boston—New fabricated structural tonnage being estimated has dropped well below recent levels, notably projects taking 200 to 1000 tons each. An increasing volume of construction is also being designed for reinforced concrete construction. For work out for bids, competition among fabricating shops is sharper with some spotty improvement in deliveries promised. Substantial number of validated jobs for first quarter has been turned back by fabricators.

Philadelphia—Filled for first quarter, structural mills are turning back CMP tickets and considerable volume will have to be revalidated for second quarter. In some cases, structural contracts placed six months back are still awaiting allotments. Restrictions on contruction are holding down new fabricated steel estimates. For a 3000-ton refinery, Gulf Refining Co., tonnage is being alloted in sections.

Pittsburgh — Producers anticipate no change in today's tight supply for at least the next six months even though allotments for schools, public roads and hospitals won't be increased before fourth quarter. It has been reported several occasions have been noted in the area where tonnages of medium-sized shapes became suddenly available. Wide flange beams and small structurals were not included in the offerings.

Cleveland—With direct defense and defense-related production and construction scheduled to get 66.2 per cent of CMP structural allotments in first quarter out of total supply of 1,425,000 product tons, not much change in tight structural supply conditions is in prospect. Of total allotments in the period, 387,407 tons are for direct defense, including 171,000 tons for the Department of Defense, and 668,706 tons for defense-related production and construction. Approximately 80 per cent of supply of structurals for industrial expansion will go principally to iron and steel mill products, aircraft and ordnance, chemicals and machine tools and general industrial equipment. In view of the continued heavy tonnage take on defense account in prospect over coming months local fabricators say considerable pending work, including much public construction, will have to be indefinitely postponed.

Wire . . .

Wire Prices, Page 91

New York—Openings in high carbon schedules, including valve spring wire, resulting from automobile cutbacks, have not been fully taken up in other directions. Trend is slightly downward in high carbon flat wire, music and other specialties due to cutbacks in civilian allotments. Further reductions are expected in second quarter.

Steel Bars . . .

Bar Prices, Page 89

Cleveland — Cutbacks in civilian durable goods in first quarter will not ease the demand pressure on bar producers since the released tonnage will be more than taken up on military and related defense account. The mills will enter the new year with substantial carryover tonnage which will add to scheduling and shipping difficulties in first quarter. Indications are military needs will continue to rise right through the year so that while some easing off is indicated in some steel products before midyear, pressure for bars is seen continuing to mount. Supply conditions will be severely aggravated should production schedules in first quarter be interrupted by a strike, currently threatened in the industry.

Pittsburgh—Bars will be just as tight in mid-1952 as they are today according to district producers. The supply-demand picture will remain unbalanced for the greater portion of next year. Cutbacks in consumer durable goods for first quarter of 1952 will unquestionably take off some of the pressure on mills, but there is increasing demand for defense and military end-uses. Mills feel the scarcity of hot-topped steel which they need for production of cold-finished material. Carry-over into first quarter of 1952 will be substantial and will work a hardship on producers in the quarter.

Boston—Tightening in carbon bars over three-inch diameter, and heavy plates, looms due to heavier directives for shell steel and hot-topping limitations. Most mills have opened books for second quarter on alloy bars and some on cold-finished carbon, including non-integrated mills. Latter are handicapped by the gap required for their own lead-time production and more extended schedules on hot-rolled bars against allocations with which to meet commitments.

Philadelphia—Only sign of easing in carbon bars is in smaller sizes. Cold-finishers are not moving all tonnage in these sizes.

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 89

Cleveland — Considerable building requiring reinforcing bars will have to be postponed until well into 1952 because of the shortage of steel. While some relief has been afforded public construction jobs, such as schools and hospitals, by NPA, it is relatively minor and most of these projects cannot hope to go ahead for months. Millions of dollars of such construction, voted up in the November election in this state, will be delayed.

Los Angeles—Small inventories of reinforcing bars coupled with lack of CMP tickets hamper many fabricators in supplying growing requirements arising from record engineering construction. Valuation of engineering construction in southern California, southern Nevada, and Arizona in November was $25,986,968, highest for the year and 175 per cent higher than in November last year.

Seattle—Rolling mills continue to operate at capacity. Substantial order backlogs remain. Demand for reinforcing bars is insistent. Reduced operations are expected due to the holidays. Bids are in for Boeing's technical building, involving 1000 tons. Northwest Steel Rolling Mills, Inc., has taken 600 tons for a Washington state bridge.

Plates . . .

Plate Prices, Page 89

Boston—Producers in some cases will not open books on plates until the first week in January hoping to have a better line on allotments for that period which are expected to be smaller. Less fabricated plate work is being estimated and warehouse stocks of narrow plates are improving. Nickel content of some high-strength low-alloy steel has been reduced or substitutions made. Small tank volume with shops is substantial, but uncertainty over plate tonnage for second and third quarters makes some reluctant to estimate long-term requirements.

Philadelphia—Light plate tonnage off strip mills, 3/16 and ¼ inch, is beginning to relieve the logjam in those sizes, but heavier gages are as tight as ever. Forward tonnage into May is being booked in some cases from strip mill plate production. Books for most second quarter plate tonnage will be opened about the first of the year and some producers are considering scheduling on a monthly basis to avoid numerous revisions later in the quarter.

Pittsburgh—Some producers' books are open for second quarter business. There has been some easing in the lighter gage material due to rolling of thinner gages on the district's continuous hot-strip mills. However, this is only a drop in the bucket and will not affect the extremely tight supply of material in this area. Fabricators still seek material and say their business is suffering due to the short supply of plates and disappointing mill deliveries.

Seattle—Plate shops could operate at capacity were materials available. Under present conditions they have to hold commitments to inventories and allocations. Chicago Bridge & Iron Co. will fabricate six large digesters for Weyerhaeuser Timber Co.'s pulp plant, Everett, Wash. Alaska railroad is planning a 1540-ft steel sheet piling dock at Anchorage, Alaska, materials government-furnished.

Heat-Resistant Steel Uses Cut

Washington — Because of the extremely short supply of nickel in comparison with the demand for heat-resistant steel, National Production Authority placed certain restrictions on specific end uses. Schedule C to order M-80 prohibits melting, processing, fabricating, delivering or using the type of material described in its tables with a higher nickel or nickel-plus-chromium content than it specifically authorizes for uses indicated in the tables.

In addition to this restriction, no person placing orders for material to be used for any purpose indicated in Schedule C is permitted to specify temperature requirements beyond those necessary for their final operation.

The order prohibits, in redesigning or rebuilding equipment or parts for the uses indicated in Schedule C, an increase in the weight of the heat-resistant chromium or chromium-nickel iron or steel alloy in any unit by more than 10 per cent of the weight of the iron or steel contained in the original design of the unit.

Exceptions for these controls are made for contracts which can be completed within 60 days from the effective date of Schedule C, if it is not possible to change specifications within that time.

Deliveries of heat-resistant chromium or chromium-nickel alloy iron or steel for any of the uses shown in Appendix 1 Schedule C may not be made unless the person delivering it has received a certification from the purchaser that the order is placed in accordance with provisions of the schedule.

Tool Steel . . .

Tool Steel Prices, Page 91

Washington—The definition "tool steel" soon will be modified by NPA to permit unrestricted use of plain carbon steel for any purpose, officials of the National Production Authority, told a meeting of the Tool Steel Industry Advisory Committee last week. This change will permit unrestricted use of plain carbon steel in the manufacture of hand chisels, pliers, wrenches, hammers, picks, screwdrivers, center punches and nail sets.

Industry representatives report that for first quarter of 1952, orders for tool steel have declined about 25 per cent from the level of six months ago. They anticipate heavier orders in second quarter.

With respect to alloys, NPA officials reported that the supplies should continue at about the same level. This applies alike to molybdenum, cobalt, tungsten and nickel.

The industry still is having difficulty in obtaining high speed steel scrap because scrap dealers and generators are holding this material for higher prices. Representatives of the industry also maintained they were at a disadvantage in foreign sales of tool steel because Canadian producers are able to ship class B tool steel, containing approximately 18 per cent tungsten, without regard to the same restrictions they are now under.

Suggestion that CMP restrictions on use of tool steel be removed was held not practicable at present as it is necessary to keep a tight control over all uses of alloy steel. However, NPA agreed to attempt to separate and identify tool steel from alloy and carbon steel in making CMP allotments for the second quarter. Also, NPA officials said they are considering revision in the present 15-day cut-off date for the carryover of orders from one quarter to the next so far as tool steel is concerned.

Among committee recommendations was one that would permit warehouses to sell tool steel up to a maximum of three tons per quarter to each customer without regard to CMP allotments.

Semifinished Steel . . .

Semifinished Prices, 89

Detroit—The district ingot rate is scheduled at 110 per cent, up 2 points. Mills here will close down on Christmas with the exception of blast furnace and coke ovens. Open hearths will be down from late afternoon Monday to Wednesday 8 a.m. Finishing mills will be idle.

St. Louis—Sale of ingots for conversion is off sharply due to cutbacks in nondefense goods, particularly appliances. Granite City Steel Co. last week completed its last conversion order and now has unsold ingot capacity open totaling 30,000 tons in the next two quarters. Scullin Steel Co. has 6000 to 8000 tons open in each quarter. The company's conversion business dropped 75 per cent in the last 60 days, chiefly because its appliance customers can't get necessary copper and aluminum supplies.

Seattle—First shipment on an order for 42,000 tons of steel ingots being produced by Isaacson Iron Works for the British Iron & Steel Corp., Ltd., was placed aboard ship here last week, destined for Liverpool, England. The first cargo totaled 250 tons.

Iron Ore . . .

Iron Ore Prices, Page 95

Cleveland—An increase of 13.92 per cent in shipments of Lake Superior iron ore this season over those for the 1950 season brought total movement to 89,092,012 tons. This is the second largest total in the history of the industry.

Lake Superior Iron Ore Association, this city, reports shipments in gross tons were made from the following ports in the last two seasons:

Port	1951	1950
Escanaba	6,542,335	5,007,221
Marquette	4,771,928	4,085,570
Ashland	2,746,616	4,889,937
Superior	31,570,513	26,425,022
Duluth	21,600,540	18,768,161
Two Harbors	19,730,558	17,039,983
U. S. Ports	86,962,490	76,265,894
Michipicoten	804,173	724,539
Port Arthur	1,325,349	1,215,159
Canadian	2,129,522	1,939,698
Grand Total	89,092,012	78,205,592

Pig Iron . . .

Pig Iron Prices, Page 88

Chicago—From here on demand for pig iron is expected to increase. While some gray iron jobbing shops require less iron because of declining order volume, other foundries with expanding defense business are taking up the slack. Foreign iron offerings have lost their appeal. Blast furnace repairs are reducing supply of iron at the same time. Interlake Iron Corp. plans to relight its South Chicago B furnace within the next week. This stack went down Nov. 1 for repairs. Inland Steel Co. blew out its Indiana Harbor No. 5 furnace Dec. 18 for repairs to take about 70 days. Of the district's 42 stacks, 39 are blowing, the smallest total in almost a year.

Cleveland—Merchant sellers would not be surprised if the threatened strike in the steel industry Jan. 1 prompted some consumers to step up their inquiries for pig iron hoping to enlarge stocks before the walkout. Since government limitations on consumer inventories prevent excessive stockpiling, however, there is little chance much change in shipments on individual account will be experienced over the next few weeks. In fact, the usual slackening attending the holidays is likely to be in evidence. Pressure for pig iron in recent months has been off compared with early summer due to the slower foundry operations attending cutbacks in civilian durable goods manufacture. Demands for merchant iron, however, still are in excess of production in this area and sellers expect the pressure on them will mount after the turn of the year as more foundries get into defense work.

Cincinnati—The pig iron market here is quiet as foundries schedule downtime for the holidays. Pressure is off the furnaces for the present with specifications for January virtually unchanged from December. Outlook for first quarter business, especially light castings, is uncertain.

Buffalo—With one blast furnace down for relining, the pressure for pig iron in the merchant market is unrelieved. There are no signs of any piling of iron at any furnaces in this district. Basic iron demand is urgent and foundries continue to press for tonnage, including the automotive casting shops.

Boston—With few exceptions gray iron foundries are not sharing heavily in defense work and some, having lost order backlog in civilian lines, are not melting as heavily. All contract tonnage is not being taken and the district furnace is building modest reserves of both No. 2 foundry and malleable.

Scrap . . .

Scrap Prices, Page 96

Washington—Iron and steel scrap ceiling price regulation (CPR5) has been amended to permit certain operators of basic openhearths and blast furnaces to apply to OPS for authority to pay established premium ceiling prices for certain premium grades of electric furnace and foundry scrap. The regulation also is amended to require certain consumers purchasing Grade 30 hard steel scrap to apply to OPS for permission to pay the established premium prices.

Also, in line with the recent reduction in differentials for foundry grades and adjustment in ceilings for No. 1 steel scrap under amendment 5, the differential for grade 30 hard steel scrap has been reduced from plus $5 to plus $3 over the base grade price.

These latest actions are covered by amendment 6 to CPR5, effective Dec. 24.

Boston—Allocations against dealers are slackening, but the drain on yard stocks in recent weeks has depleted tonnage which has not been fully made up by incoming steel scrap for preparation. Turn for the worse in weather has also hampered replacement. For the time being consumer stocks of steel scrap are in better shape, but accumulations are not sufficient for the long pull entering the winter season.

Buffalo—Near zero temperatures and heavy snowfall sharply curtailed the movement of scrap in western New York last week. Fresh receipts at dealers' yards were virtually nil. Dealers processed material on hand to maintain a light flow of scrap to mills which continued to report diminishing stockpiles.

Philadelphia—While consumer steel scrap reserves are somewhat higher, dealer yard stocks have been lowered and tonnage moved under allocations has not been balanced by heavier

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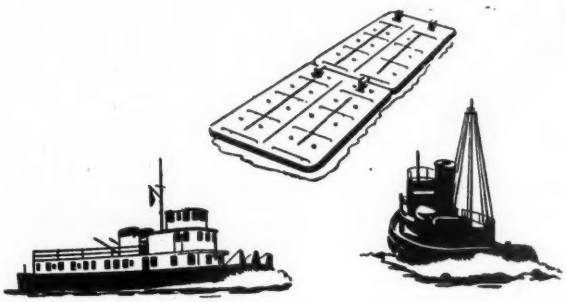

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intake by shippers. Yards are hard put to maintain operations at incoming tonnage rate. Foundry grades are less feverish and inventories with consumers and yards are better balanced.

Cleveland — Movement of scrap dropped sharply here last week as a result of a heavy snow storm and unusually low temperatures. Some yards were closed down completely for three days. Consumers were able to maintain operations by drawing on inventories. Trade interests look for a slow market over the balance of this year. If the steel industry is struck at yearend, an opportunity will be afforded for accumulating scrap supplies for future melting operations. The extent of the stock build-up will depend, of course, on the length of time the mills are closed down. Basic open-hearth and blast furnace consumers will be able to obtain substantial tonnages of grades 11 through 18 and grades 20 and 21, if they can obtain permission from OPS to pay the premiums. They are permitted to apply for this permission under amendment 6 to CPR 5. Premium on grade 30 is reduced to $3 over the base grade.

Detroit—Subzero weather and deep snow virtually paralyzed dealer yard operations last week and cut down mills' intake of scrap. All consumers, however, are able to hold out for limited periods, their inventories presently being adequate if not comfortable. Foundry demand continues sluggish, reflecting the reduced rate of automotive production.

Youngstown—Return of severe winter weather is cutting down mill scrap supplies and threat of sharp curtailment in district steelmaking operations is more serious. Virtually all steelmakers in the district are scraping bottom as regards scrap supply.

Cincinnati—Scrap tonnage in sight, inventory and in shipment, will support the high level of melting by district mills past year end. After that the mills will likely face a critical period. The effect of the recent slowing in collections and preparation is not yet reflected in movement of scrap to consumers. Foundry grades, excepting steel, are easier.

Chicago—The near-record snowfall and accompanying subzero wave which descended on this district within the past 10 days will cast its shadow on steelmaking operations shortly. Extremely narrow scrap inventories at a few plants, greatly decreased activity in scrap collection and preparation, and slow rail movement are bringing furnace shutdowns disturbingly close. Prior to the snow and cold, United States Steel Co. had managed to raise scrap inventories at its two plants to about eight days supply but it seems that this gain will be lost. Blast furnace and foundry grades continue adequate.

St. Louis — Auto wreckers here promptly protested the government ban on "hoarding" cars more than 5 years old. Scrap brokers doubt any early results, however, and expect little new auto scrap will move to consuming channels soon. In this district it is a minor tempest which will have little effect either way on supplies. Full compliance with the order would probably yield not more than 5000 tons of additional auto scrap annually. The St. Louis area alone uses around 200,000 tons of scrap of all kinds monthly.

Warehouse . . .

Warehouse Prices, Page 95

Detroit—Although CPR 98 became effective Dec. 16, several major warehouses report they have not completed computations necessary to establish their new prices. Locally, prices went both ways, companies which have refigured say.

One interest reduced hot-rolled sheet to 5.79c from 5.95c, cold-rolled sheet to 6.47c from 6.80c, hot-rolled strip to 5.76c from 5.95c, cold-rolled strip to 7.15c from 7.75c and plates to 5.88c from 6.35c. Another upped hot-rolled sheets from 5.98c to 6.06c, cold-rolled sheets from 6.73c to 6.84c, hot-rolled strip is priced at 6.70c consolidating in one price two size ranges which had previously carried separate prices, cold-rolled strip from 7.21c to 7.50c, hot-rolled bars from 6.04c to 6.14c, cold-finished bars from 6.86c to 6.89c, hot-rolled alloy 4140 to 9.13c, structurals from 6.33c to 6.32c, carbon plates from 6.38c to 6.32c, and floor plates from 7.48c to 7.41c.

Cleveland—District warehouse operators were busy last week putting their new ceiling price schedules into effect under CPR 98. Some minor

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By installing Henderson Tube Making Machinery you can produce tubes and sections in any shape, in any diameter between ½" and 4½" and automatically cut-off to your exact requirements at speeds up to 130' per minute.

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Electric Fusion Tube Mills for steel tubes.

Atomic Arc Tube Mills for tubes in alloy steels such as stainless, chrome-molybdenum, etc.

Section Rolling Machines for cold rolled section in Ferrous or any other ductile material.

Air Hydraulic Presses (4 ton) for Tube manipulation.

2-Spindle De-Frazing Machines for de-Frazing the inside and outside ends of tubes.

HENDERSON TUBE MAKING MACHINERY

Illustration shows Henderson Electric Fusion Tube Mill which provides a continuous operation from the strip to the finished tube and all under the control of one operator. Electronic control of weld-heat is instant and stepless.

TUBE MAKING MACHINES LIMITED
BLAENRHONDDA, GLAMORGAN, WALES. Telephone: Treherbert 292/3. Telegrams: Tubemac, Treorchy.

rollbacks in quotations, possibly 1 to 2 per cent, result from the regulation, but there also are some slight increases. Since individual warehouse freight costs differ, one from another, expectations are the price of that seller with the lowest freight charges will be generally accepted as representative for the district since other sellers will have to meet the lower price in competition. CPR 98 is seen as effectively squelching gray market operations. These have been relatively limited over recent months, however, especially since the Controlled Materials Plan was effected.

Exact level of the district market under the new pricing setup is uncertain, some distributors still not having completed their figuring. Representative prices in the district are: hot-rolled sheets, 5.54c; cold-rolled sheets, 6.32c; galvanized sheets, 7.96c; hot-rolled strip, 5.65c; cold-rolled strip, 6.98c; hot-rolled bars, 5.57c; cold-finished bars, 6.40c; structural shapes, 5.95c; carbon plates, 5.87c and tank plates, 7.19c.

New York—With exception of wire products, warehouse steel pricing under CPR-98 is generally satisfactory. In New York Metropolitan area the markup on nails, staples, barbed wire and posts, annealed wire and netting is 20 per cent compared with normal 35 per cent. In establishing prices distributors may strike an average on mill base prices and freights when buying from several producers. They pass on higher freight charges and certain extras, including galvanized, which have been absorbed. Galvanized sheet allocations in some cases have been reduced to 35 per cent of quotas, the difference being made up with black sheets.

Cincinnati — Warehouses adjusted their prices to new ceiling price regulations. Changes are small and irregular. Quotations thus far announced do not fully reflect adjustments to competitive conditions as demand is sustained to a degree that stocks are unimproved.

Representative prices quoted are: hot-rolled 16 gage sheets, 5.99c; cold-rolled sheets, 6.53c; galvanized 10 gage sheets, 8.44c; hot-rolled strip, 6.15c; hot-rolled bars, 5.90c; cold-finished bars, 6.79c; structurals, 6.24c; carbon plates, 6.29c; floor plates, 7.43c.

Canada . . .

Toronto, Ont.—Pig iron production in the 10 months ended Oct. 31, totaled 2,108,646 net tons, which compares with 1,903,262 tons in the 1950 period and with 1,825,023 tons in 1949.

Production of steel ingots and castings for the 10 months totaled 2,963,741 net tons, which compares with 2,803,401 tons for the 1950 period and with 2,663,259 tons in the first 10 months of 1949.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2185 tons, Bellevue Medical Center, New York University, New York, to Dreier Structural Steel Co., New York.

2100 tons, steel mill buildings, Green River Steel Corp., Owensboro, Ky., to Allied Structural Steel Co., Chicago.

500 tons (estimated) 28 sets stop logs and other equipment, McNary dam; to Gunderson Bros., Portland, Oreg., low $632,142.

250 tons (estimated) penstock, gates, guides, etc., Detroit dam, Oregon, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

220 tons, Washington state bridge, Grays Harbor county, reported to Poole, McGonigle & Dick, Portland, Oreg.

105 tons, two bridges, Providence, R. I., to American Bridge Co., Pittsburgh, through M. A. Gammino Co., Providence, general contractor.

100 tons, gate hoist, etc., Big Cliff dam, Oregon, to Northwest Marine Iron Works, Portland, Oreg.

STRUCTURAL STEEL PENDING

15,000 tons, railroad bridge, Harlem river, New York.

2500 tons, hangar for Boeing Airplane Co., Seattle; bids scheduled in January.

1400 tons, power and outlet tunnels, Palisades dam, Idaho; government will furnish 800 tons; general contract to J. A. Terteling & Sons, Boise, low to Bureau of Reclamation, $1,242,700.

125 tons, Nenana river bridge, Alaska; bids to Alaska Railroad rejected; agency plans to construct.

Unstated, three bridges, guide beams, etc. Hungry Horse project, Montana; bids to Bureau of Reclamation, Columbia Falls, Mont., Jan. 14; 58 tons plates and 14 tons shapes will be furnished by government.

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, state bridge, Marysville, Wash., to Northwest Steel Rolling Mills Inc., Seattle; general award on rebid to Guy F. Atkinson Co., Seattle, low $607,605.

300 tons, grain elevator addition Port of Longview, Wash., to Soule Steel Co., Portland, Oreg.; Henry George & Son, Spokane, Wash., general contract.

120 tons, Washington state bridge, Grays Harbor county, to unstated Portland supplier.

REINFORCING BARS PENDING

1000 tons, Boeing Airplane Co., engineering-office building, Seattle; bids in.

PLATES . . .

PLATES PLACED

1000 tons plus, six digesters Weyerhaeuser Timber Co.'s new pulp plant, Everett, Wash., to Chicago Bridge & Iron Co., Seattle.

450 tons, 10,500 feet, 30 inch, ¼ inch water supply pipe for Everett, Wash., to Hydraulic Supply Mfg. Co., Seattle, low $91,665.

PLATES PENDING

100 tons, McMillan reservoir improvement, Tacoma, Wash.; bids opened Dec. 17.

100 tons, elevated tank, McChord Field, Washington; bids Dec. 21.

Unstated, 1540-foot sheet steel piling dock, Anchorage, Alaska; bids to Alaska Railroad, Anchorage, Jan. 14; steel, government-furnished.

PIPE . . .

CAST IRON PIPE PLACED

400 tons, 35,000 feet for system extension, Seattle, to Pacific States Cast Iron Pipe Co., Provo, Utah.

150 tons, 18,000 feet 4 to 12 inch, Vancouver, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, lease from Equitable Life Assurance Co., 55 diesels; 37 to Electro-Motive Division, General Motors Corp., LaGrange, Ill., 12 to American Locomotive Co., New York, and 6 to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Boston & Maine, 39 diesel-electric locomotives; 23 to American Locomotive Corp., New York, and 16 to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

LOCOMOTIVES PENDING

Erie, 42 diesel locomotives, including 30 road switchers and 12 yard switchers; purchase authorized.

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BLUE TEMPERED SPRING STEEL
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Send data on your Design, Engineering & Construction Facilities for erection of
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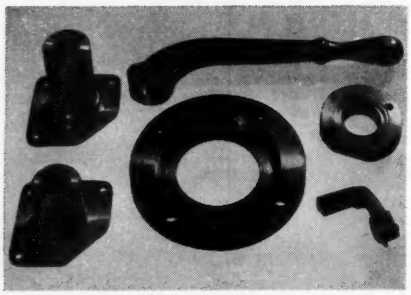

Specify gray iron for smaller operating parts, too, like these components of the torque control pictured above.

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BECAUSE GRAY IRON DOES THE JOB AT LOWER COST, the designer specified gray iron castings for this torque control housing. He knows you can't beat gray iron for ready machinability at a specified pressure strength level.

GRAY IRON GIVES YOU ALL THESE ADDED PRODUCTION ADVANTAGES: Castability, rigidity, low notch sensitivity, wear-, heat- and corrosion resistance, durability, vibration absorption, wide strength range.

SO SPECIFY GRAY IRON when you need a part that must meet many structural and functional requirements—with economy. We know gray iron will satisfactorily serve your needs.

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GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Heppenstall Forms New Firm

C. W. Heppenstall organized the Heppenstall Industrial Service Co., a new firm which will serve as a consultant in the application and installation of modern techniques in the forging, steel processing, steel fabricating and paper industries. The company will maintain headquarters in the Frick building, Pittsburgh. Mr. Heppenstall formerly was vice president in charge of operations for Heppenstall Co., a producer of forgings, shear knives and die blocks.

Mr. Heppenstall was responsible for the introduction in this country of high-speed trepanning technique and a method of contour forging breech rings for guns. He also introduced in this country the production use of an immersion thermocouple to take liquid bath temperatures in acid open-hearth, electric arc and high-frequency induction furnaces.

Plans Metal Furniture Plant

Douglas Furniture Corp. is constructing a plant for manufacture of chrome dinettes, at 3308 W. El Segundo Blvd., Hawthorne, Calif.

Pioche Places Kiln Contract

Pioche Manganese Co., subsidiary of Combined Metals Reduction Co., Salt Lake City, Utah, awarded a contract to Standard Steel Corp., Los Angeles, for construction of a rotary kiln to be erected at Pioche, Nev. The kiln will be used to process manganese dioxide ore.

Wheelco Instruments Moves

Wheelco Instruments Co., 843 W. Harrison St., Chicago, moved its Western Division sales and service office to 2320 Milwaukee Ave., Chicago 47.

Student Loan Fund Set Up

Establishment of a General Motors Institute co-operative student loan fund for the benefit of students enrolled in or candidates for co-operative engineering or co-operative business administration programs was announced by Guy R. Cowing, Institute president.

Garlock Forms New Division

Export operations of Garlock Packing Co. were consolidated and the New York office at 30 Church St. was made headquarters of Garlock Export Division. The company manufactures mechanical packings. Distribution to the Philippine and Hawaiian islands will remain under the jurisdiction of Garlock's San Francisco office. R. S. Parker was appointed manager of Garlock Export Division.

Atlas Chain Opens Branch

Atlas Chain & Mfg. Co., Philadelphia, established a branch office at 250 W. 57th St., New York 19. Oliver J. R. Troup Jr. is district manager.

Gear Works Boosts Output

Western Gear Works is adding manufacturing facilities to increase production of gears by 30 per cent at its Los Angeles plant, 2600 E. Imperial Highway, Lynwood, Calif.

Sterling Appoints Agents

Sterling Electric Motors Inc., Los Angeles, appointed the following additional distributors: Allied Bearings Supply Co., Tulsa, Okla.; Berry Electric Co., Walla Walla, Wash.; Alabama Bearings Co. Inc., Montgomery, Ala.; Stanley Electric Motor Co., Stockton, Calif.; Roy A. Berentz Co. Inc., Houston.

Wurdack Plans Addition

William Wurdack Electric Mfg. Co., a division of Federal Electric Products Co., St. Louis, will construct an addition to its plant.

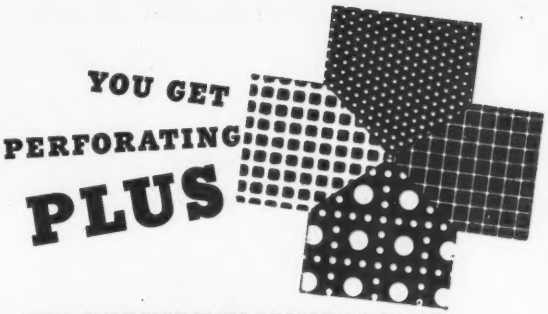
Well Turbine Division Bought

Byron-Jackson Co. Los Angeles, bought the Deep Well Turbine Division, A. D. Cook Pump Co., Lawrenceburg, Ind. Purchase, involving more than $1.3 million, was made from Oliver L. Bardes who acquired the property last March from American Steel & Pump Co. Byron-Jackson plans to move its entire vertical pump operations from Bethlehem, Pa., Houston and Los Angeles to Lawrenceburg where production is expected to be doubled.

Canco Steps Up Research

American Can Co., New York, established a Research & Technical Service Department to enable the company to place more emphasis on creative research. The department will consist of Research, Development, Technical Service and Agronomy divisions.

The Research and Development divisions will be concerned with applied re-



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GANG SLITTING KNIVES
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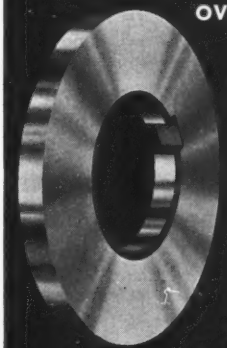

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They're All Scrap

They're all needed to keep steel production up

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Every pound of unused iron and steel you have is needed to help steel mills and foundries keep production up to rising capacity.

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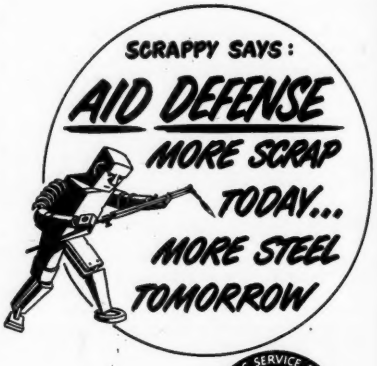
One way we can maintain desired level of both military and civilian production is for you to *dig up* and *turn in* your iron and steel scrap now.

Get in touch with your local scrap dealer and write for the free booklet, "Top Management: Your Program for Emergency Scrap Recovery" to Advertising Council, 25 W. 45th St., New York 19, N. Y.



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STEEL

The Weekly Magazine of Metalworking

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search in the fields of packaging and container manufacture, including such outstanding projects as the conservation and eventual elimination of tin, etc.

Dr. B. S. Clark, formerly director of research, was appointed scientific director; Dr. R. W. Pilcher, director, Research Division; D. F. Sampson, manager, Technical Service Division. Dr. F. W. Geise remains manager of the Agronomy Division at Chicago. The Development Division has yet to be activated.

A special laboratory at Maywood, Ill., will be devoted exclusively to applied research while the remainder of the staff of the former general laboratory at Maywood will function as a technical service unit for the company's Central Division along with similar divisional laboratories at Newark, N. J., San Francisco and Hamilton, Ont.

Sierra Expands Bar Mill

Sierra Drawn Steel Corp., Los Angeles, has completed a 30 per cent increase in plant area. Sierra Drawn Steel comprises the only independently owned cold finishing bar mill in the West.

Cadillac Plastic Moves

Cadillac Plastic Co. moved to new and larger quarters at 15111 Second Ave., Highland Park, Mich. Robert Jacobs is president and secretary.

Work Starts on Pump Plant

Fairbanks, Morse & Co., Chicago, awarded a contract for the yard work for its new pump plant in Kansas City, Kans. Contracts will be let later for the actual construction of the plant which is scheduled to begin next spring. The new plant will have a machine shop, a foundry, and an office building.

Coast Divisions Consolidate

Union Carbide & Carbon Corp., New York, is consolidating six of its subsidiary West Coast operations in one office and warehouse building at 2768 Leonis Blvd., Vernon, Calif. These include the West Coast operations of: Bakelite Co., Carbon & Carbide Chemical Co., Electro Metallurgical Co., Linde Air Products Co., Haynes Stellite Co. and National Carbon Division.

Seeks Welding Alloys

Construction of a new wing to house two new research laboratories has been completed by Eutectic Welding Alloys Corp., Flushing, N. Y. A special staff of research chemists and physicists will concentrate on development of new welding alloys utilizing fewer critical metals in today's shortage-burdened market. Research on new metals, such as titanium joining, also is included among the projects scheduled for this group.

Offers Protective Coatings

Pittsburgh Coke & Chemical Co., Pittsburgh, opened an office at 75 E. Wacker Dr., Chicago, to direct the sale of the company's industrial protective coatings in the Midwest. Joseph R. Robinson will be in charge of the sale of pipeline enamels; Ralph G. Mensch, sale of synthetic coatings.

Lea Opens Waterbury Plant

Lea Mfg. Co., Waterbury, Conn., is operating its new plant which contains 22,000 square feet of additional space. The company's projected expansion program includes additional storage space, a compound plant, laboratory and office.

Uniform Tubes Names Agent

Uniform Tubes, Collegeville, Pa., manufacturer of fine seamless tubing, appointed Griswold & Co., Needham, Mass., as exclusive representative for New England, excepting Fairfield county, Connecticut.

Canadian Distributor Named

United States Air Conditioning Corp., Minneapolis, appointed Creamery Package Mfg. Co. of Canada Ltd., Toronto, Ont., as its exclusive representative to handle its line of air conditioning, heating and ventilating equipment in that country.

Taco West Appoints 9gents

Taco West Corp., Chicago, appointed as representatives: Norman Bragar Co., Newark, N. J.; Gibson Engineering Co., Boston and Hartford, Conn. Taco West manufactures precision instruments for industrial control.

Edgcomb Buys Land in South

Edgcomb Steel Co., Philadelphia, purchased about four acres of land in Greensboro, N. C. This metal service organization, handling aluminum, brass, carbon steels, stainless steels and tool steels, announced no plans for development of the property.

Meehanite Names Winners

Winners of Meehanite Metal Corp.'s casting design contest, open only to design engineers in manufacturing plants using castings, are in the order of awards: H. D. Samuel Jr., McCulloch Motors Corp., Culver City.

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THE WHELAND COMPANY

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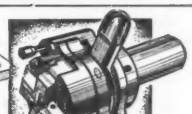
famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.



THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.

Pacific Coast Representative: A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California. Canada: F. F. Barber Machinery Co., Toronto, Canada.

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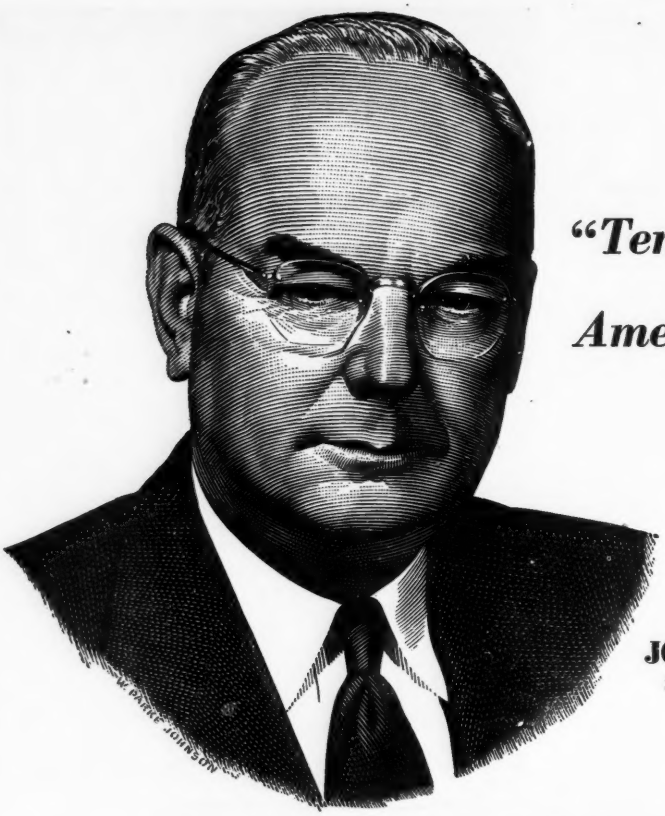

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JOHN W. SNYDER
Secretary of the Treasury

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In ten brief years:

- From 700,000 in 1941 employee participation went to 27,000,000 at the peak of the war.
- Companies with Payroll Savings Plans jumped from 10,000 in 1941 to more than 175,000 during the war.
- Since January 1, 1951, the number of men and women on Payroll Savings has grown from 5,000,000 to 6,200,000.
- On September 30, 1951, individuals held Series E Bonds totaling $34.6 Billion—more than $4.6 Billion greater than on V-J Day.
- In the January-September, 1951, period, 33,418,000 $25 E Bonds were purchased—a gain of 17% over the same period of 1950. 8,966,000 $50 E Bonds were sold in the first nine months of 1951. *$25 and $50 denominations are the bonds bought by Payroll Savers.*

Congratulations to the executives of industry and the publishers of business papers for their continuing effort in promoting systematic savings through the Payroll Savings Plan—the plan that protects America and Americans.

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STEEL
The Weekly Magazine of Metalworking

Calif.; William H. Thomas, Roots-Connersville Blower Corp., Connersville, Ind.; Al Gorski, George Gorton Machine Co., Racine, Wis.; Henry Hubbell, Fafnir Bearing Co., New Britain, Conn.; Robert E. Greenawalt, Salem Engineering Co., Salem, O.; Max M. Beasley, Cobble Bros. Machinery Co. Inc., Chattanooga, Tenn.

Continental Divisions Unite

Vulcan Soot Cleaner Division, Continental Foundry & Machine Co., DuBois, Pa., will be merged with its Northern Equipment Co. Division, Erie, Pa. Both divisions will be housed in the former Talon plant in Erie. Merger of the two divisions is a natural one because both make products which complement each other.

Acme Moves Export Offices

Export headquarters of Acme Steel Co. will be moved shortly after Jan. 1 to State-Madison building, 22 W. Madison St., Chicago. The company's foreign sales subsidiaries, Acme Steel Overseas Co. and Acme Steel International Co. will occupy the new quarters. J. W. Schwenger is president of both subsidiaries.

Union Steel To Build Plant

Union Steel Co., Los Angeles, will build a steel fabricating and manufacturing plant on a 10-acre tract southeast of Santa Ana, Calif. A working area of 250,000 square feet is planned eventually.

Buys Thomas Register Mfg.

Herring-Hall-Marvin Safe Co., Hamilton, O., purchased all assets of Thomas Register Mfg. Co., Canton, O., maker of specialties for banks, such as filing cabinets for record safes and boxes for safety deposit vaults. Operations at Canton will be expanded. Warren F. Mosman, president of the safe company, also becomes president of the acquired firm. Officers of the Canton firm include: Vice president, Harold O. Thomas, Canton; vice president and treasurer, Glen F. Rittenburg, Cleveland.

Reliable Spring Expands

Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland, moved into larger general offices on the ground floor of the building which it has occupied for some time. Facilities for manufacture of close tolerance mechanical springs, particularly those required in bomb, shell and rocket fuses, have been expanded about 25 per cent. The company is placing in operation a new type machine which it developed and which makes possible the manufacture of small rings about 500 per cent faster than by traditional methods. It can handle rings up to about 1 inch in diameter, made from any type of material, including high-tensile spring steels, phosphor bronze, beryllium-copper, stainless steel and other special alloys.

Reed-Prentice Opens Office

Reed-Prentice Corp., Worcester, Mass., opened a branch sales office at 2842 W. Grand Blvd., Detroit, under the management of Iver J. Freeman. Reed-Prentice manufactures machine tools, die casting machines and plastic injection molding presses.

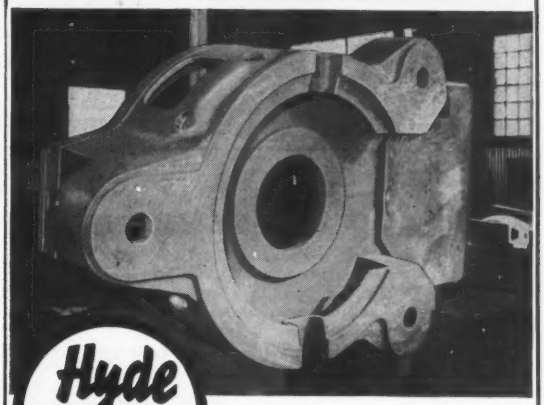
Macklin Expands Factory

An addition, nearing completion, to the manufacturing facilities of Macklin Co., Jackson, Mich., will increase production capacity by about 35 per cent. The company manufactures grinding wheels.

Jelliff Names Distributor

C. O. Jelliff Mfg. Corp., Southport, Conn., appointed Pennsylvania Industrial Supplies Co. Inc., Pittsburgh, as its representative in that area for all products except electrical resistance wire. Jelliff makes wire mesh, fabricated mesh products.

A LONG HAUL: It took two heavy-duty tractor-carryall outfits from the Cleveland Cartage Co.'s fleet to haul this 138-foot steel cracking tower. The two tractors synchronized their movements in hauling the tower from a railroad siding to the erection site at Sohio's Cleveland refinery



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CASTINGS

Semi-Steel and Gray Iron

Castings up to 80,000 pounds — Furnace Castings, Machinery Castings, Slag Pots, Bases, Lathes, Heavy Tools, Housings, etc.

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WE FEATURE SPECIAL PUNCHES & DIES

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SCREW MACHINE PRODUCTS made to your order!

SET SCREWS CAP SCREWS SPECIAL PARTS

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Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

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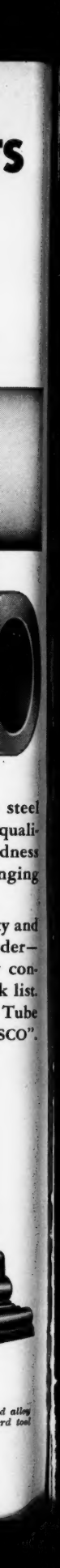
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